

THE BIEGEST COMPANIES IN

April 23, 2001

Volume 18, Number 17

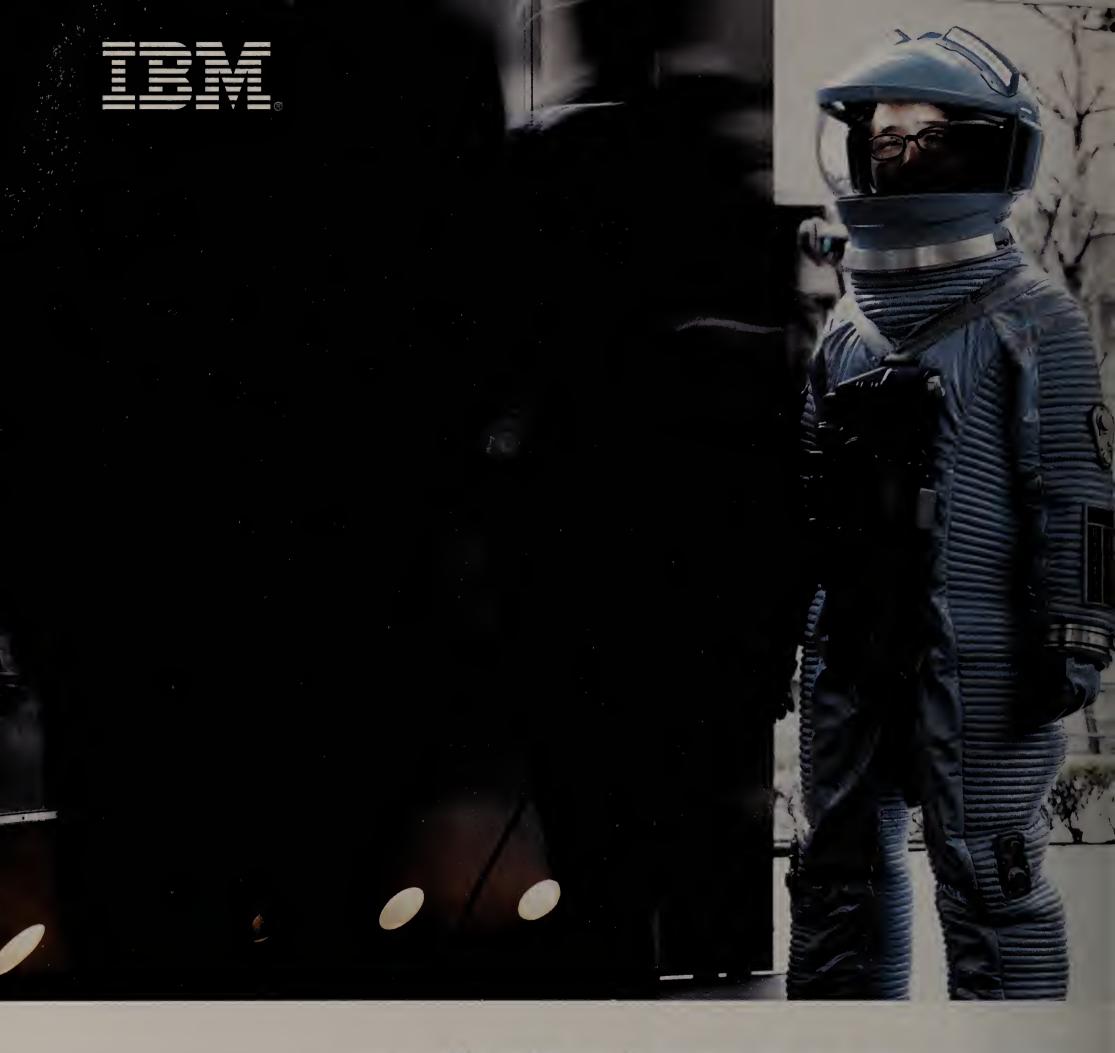
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Examining the promises of globalization

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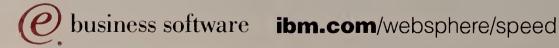
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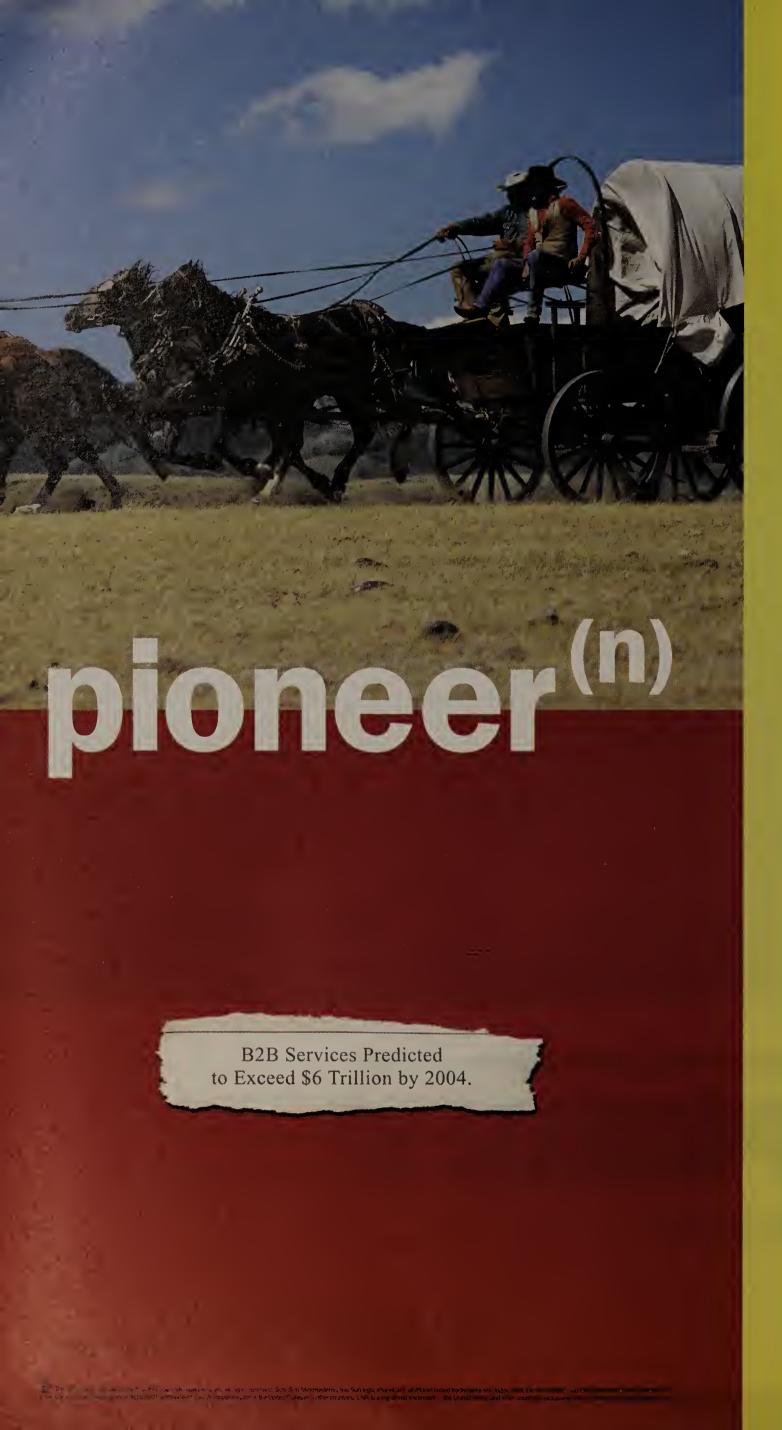


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#### NEWS

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After a year-long search, auto marketplace Covisint named Kevin English as its chief executive and chairman. Read why this isn't the end of Covisint's challenges, however. DocFinder: 3963

#### FORUMS

#### Network vs. desktop virus scanning

Which makes more sense? Or should an administrator use both to protect his network? DocFinder: 3951

#### Doppler stats?

A user says a consultant proposed looking at his network with some Doppler bandwidth utilization stats. But he's never heard of such things. What are they? DocFinder: 3952

#### **Experience** meets opportunity

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Get answers to your important LAN questions. Share ideas and insights with industry leaders to plan, support and secure your LAN. DocFinder: 3954

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#### CARUSO'S CACHE

The best of the NetFlash daily newsletter

#### Microsoft security flaw can lead to DoS

DoS may stand for "denial of service" rather than "Disk Operating System" these days, but the term is still often heard in conjunction with Microsoft. The company said recently that its Internet Security and Acceleration Server 1.0 is vulnerable to a denial-of-service attack, in which a simple string of characters is sent to the server to shut it down. DocFinder: 3964

#### Sun seeks comic relief during tough times

Remember how Sun branded itself as the "dot" in "dotcom?" Right now, Sun hopes you don't, because by association that would make Sun the "dot" in "dot-bomb" or "dotgone." Still, the company gets high marks for looking at the lighter side during a recent conference, where it unveiled a new — and very honest — slogan. DocFinder: 3965

#### Accenture throws hat into IPO market

Hey, why not? You don't see a lot of IPOs these days, with the stock market behaving as it has been. But Accenture thinks it has what it takes to raise a billion dollars through an IPO. More power to 'em. DocFinder: 3966

#### IBM's guerilla ad campaign irks San Francisco officials

In its attempt to co-opt the hippie ideals of peace, love and Linux, IBM has gotten in trouble with the Man (or Woman, as the case may be). Seems the city of San Francisco isn't too amused by its latest ad campaign, which involves spray-painting symbols on sidewalks around town. IBM is trying to shed the image of a company of blue-suited capitalists, but I don't exactly expect to see Lou Gerstner live in a commune anytime soon — especially because it did relatively well in its recent earnings. DocFinder: 3967

--- Jeff Caruso, managing editor, online news

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#### COLUMNISTS

#### Compendium

Just monkeying around Fusion Executive Editor Adam Gaffin finds a new product from Monkeyphonecall.com guaranteed to drive your friends ape. What better way to spend 10 bucks?

DocFinder: 3956



#### Keeping Current

The future of e-commerce

Fusion Columnist Fred McClimans remarks on two interesting Internet deals that highlight the changing landscape of the Web. DocFinder: 3957

#### Help Desk

Booting Up

Ron Nutter helps a user set up a dual boot system for Windows 2000 and Windows ME. DocFinder: 3958

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## Always-on

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# News

## Cisco, AT&T throw weight behind new carrier

Newcomer Velocita building nationwide fiber network to offer managed wavelength and other services.

BY DENISE PAPPALARDO AND JIM DUFFY

RESTON, VA. — In a most unusual setup, start-up carrier Velocita is readying a nation-wide broadband network funded in large part by Cisco and based on AT&T's extensive rights-of-way.

The company, which has been operating since 1998, is building a big chunk of AT&T's next generation optical network in return for the rights-ofway, \$220 million and other incentives, according to a Velocita 10-Q filed last fall. Cisco may be forking over \$485 million in funding and equipment financing, according to an 8-K filed 10 days ago. The Cisco funding still needs approval from the SEC.

Velocita will initially be a car-

rier's carrier, but may eventually offer an alternative to enterprise customers concerned about using other new carriers that are scrounging around for new funding. A rash of competitive local exchange carriers failed in recent months, stranding customers and leaving unpaid debts on the doorstep of overenthusiastic equipment makers that supplied gear to CLECs on credit.

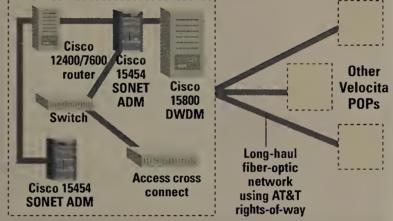
While Velocita is happy to have AT&T and Cisco supporting it, the company hopes to make a name for itself by delivering a slew of advanced services such as managed wavelengths, VPNs and high-speed private lines.

Cisco, which has proven particularly vulnerable to the CLEC meltdown, seems certain it won't be stung by Velocita. The

#### A network to bank on

As a result of investments Cisco and AT&T have made in Velocita, the new carrier's managed wavelength service will use several Cisco products and AT&T's rights-of-way.

Typical Velocita point of presence



vendor's equity stake in the new carrier is valued at \$200 million and the financing at \$285 million. This is the first time Cisco has taken an equity stake in one of its customers.

"It's unusual, but what Cisco

needs is a prototypical network that they can point to and say, 'This is how we believe networking needs to go,' "says Current Analysis analyst Chris Nicoll. "Cisco's got a very different viewpoint than Nortel or Lucent on how an intelligent optical network should be architected. They can't point to a WorldCom, or Broadwing, or someone who's got a network in the field and say, 'This is the implementation of our strategy."

#### Forcing Cisco's hand

Others say today's capital environment is forcing Cisco to invest more if it eventually wants to receive more.

"In the past, Cisco has opted not to purchase equity as it did not want to have an ownership interest in any of its customers," investment firm UBS Warburg stated in a recent report. "We believe Cisco has broken this policy [because] the capital markets are virtually shut for new, emerging carriers. We believe Cisco will only do a small number of such equity investments and only as long as equity markets remain tight."

UBS Warburg added that Velocita's unique arrangement with AT&T and its management team attracted Cisco's unusual investment. But the start-up carrier's relationship with AT&T adds another twist.

Velocita may end up competing with AT&T, but the more likely scenario is that AT&T will work out an exclusive arrangement with Velocita where that will not occur.

"AT&T's network is archaic and the cost of operating it is much higher than its competitor's networks that have been built in the last five years," says Christine Heckart, president of TelcChoicc. "The company's choices are to outsource its network operations and concentrate on its cus-

See Velocita, page 124

### Cisco users mostly unshaken by vendor's woes

BY PHIL HOCHMUTH

Cisco may be the poster child for what's ailing Wall Street, but customers maintain they are largely unconcerned about their primary vendor's long-term health. Which isn't to say they don't have questions.

"[I'm] unfazed by the financial issues surrounding Cisco," says Bill Homa, CIO of Hannaford Brothers, a supermarket management firm in Scarborough, Maine. "They're essentially our sole vendor for our LAN/WAN communications and will remain so."

Homa sees Cisco's struggles as "partly their fault, partly the economy's fault," but he does not foresee any negative effects on his company's future deals with the network vendor.

Cisco has indicated that its U.S. enterprise business will be

down 20% in the third quarter of this year compared with the second quarter, while its service provider sales will drop by 40%. The fact that Cisco's struggles lie more in the carrier market is another reason Homa isn't worried.

"As far as our [IT] expenditures, we've accelerated our spending with Cisco, primarily because of the deals that are available," Homa says. He presumes those bargains are designed to drive up the vendor's lagging sales.

Jim Olson, CIO of Waterbury Hospital in Waterbury, Conn., relies on Cisco for most of his data network, and doesn't anticipate that changing. Olson notes that when he looks at his other IT assets, he sees names such as Dell and Hewlett-Packard, companies that are also having sales slumps.

"I believe it's a market thing,"

he says. "I'm just as confident in Dell as I am in [HP or Cisco]."

Olson also sees Cisco's bloated inventories as an opportunity to upgrade his

"I say to myself, 'Wow, I wonder if they're going to have a fire sale with these flooded inventories. What could I pick up that's really good equipment that has the three-to-five-year life span I need?'"

This year and last have been a tale of two markets for Cisco. In 2000, the company enjoyed sequential quarterly revenue growth between 13% and 16%. Now the vendor anticipates revenue will be down 30% in its third quarter, while it takes a restructuring charge of up to \$1.2 billion and an excess inventory charge of \$2.5 billion. Cisco will also cut 8,600 jobs.

An IT executive from a large

New England manufacturing company has only one major worry relating to Cisco's health.

"As long as Cisco keeps up its customer service" there will be no need to panic, the executive says. Although Cisco's job-cut news is not a good sign, he doesn't anticipate any drop-off See Cisco, page 124

Read how Cisco will take a huge charge against earnings for its fiscal third quarter, and follow our links to other companies' recent financial results.

## NEWS BRIEFS, APRIL 23, 2001

#### Microsoft security bug found

A server Microsoft released two months ago and touted as its first major security offering was found to have a bug that could lead to a denial-of-service attack. SecureXpert Labs reported the flaw last week, and Microsoft issued a patch for its Internet Security and Acceleration (ISA) Server, a combination firewall and cache. The bug allowed a user to send a certain string of characters to the ISA Web Proxy service and crash the service, blocking access to and from the Web.An attack from the corporate side of the firewall could be launched under any circumstances, but an attack from outside is only possible if Web Publishing is activated on ISA. The patch is available at www.microsoft.com/ downloads/release.asp?releaseID=29081.

#### New alliance to sell CERT alerts

The federally funded Computer Emergency Response Team Coordinator Center, which posts alerts about security threats, last week said it will sell the early warnings it gets about security alerts to members of a new Internet Security Alliance. That alliance was formed last week by CERT, the Software Engineering Institute and the Electronic Industries Alliance. Membership will cost between \$2,500 and \$70,000. CERT, based at Carnegie Mellon University, said the security-alert information will be posted on its Web site about 45 days after it is sold through the Internet Security Alliance. CERT shares the security alerts with the Defense Department and the General Services Administration.

#### SmartPipes hires new CEO

SmartPipes, the start-up that manages VPNs for other service providers, has named Hank Nothhaft its new CEO. Nothhaft comes to SmartPipes from XO Communications, where

he was vice chairman. Before that he was CEO of Concen-Networks, tric which merged with Nextlink to form XO. SmartPipes is about to launch its first service, Global IP Services, with WorldCom as its inaugural customer. SmartPipes founder and now former CEO Ray Bell will



Hank Nothhaft was recently named CEO of SmartPipes.

become CTO and keep his position as chairman.

#### IBM snaps up Mainspring

IBM last week said it would acquire business strategy consulting firm Mainspring in a deal worth more than \$80 million. The acquisition is viewed as a move to help improve the consulting capabilities of IBM's Global

Services Division. Under terms of the agreement, IBM will pay \$4 per share in cash for all outstanding Mainspring common stock. Mainspring CEO John Connolly will become the general manager and global head of e-Business Strategy and Change Practice within Business Innovation Services, the consulting arm of IBM Global Services. The deal is expected to close in mid-June.

#### Auto marketplace gets a driver

Covisint last week appointed Keith English as its chairman, CEO and president after a year-long search. English will take over the



Kevin English takes the driver's seat as Covisint's chairman, president and CEO.

reins on May 1. Prior to joining Covisint, English managing was director and CEO of e-commerce at Credit Suisse First Boston and chairman and CEO at The Street.com, an online financial site. The CEO search has been going on since the automotive marketplace was formed

by General Motors, Ford Motor and Daimler-Chrysler in February 2000. Before English's appointment, executives from the three automakers ran Covisint.

#### Nortel cuts 5,000 more jobs

Nortel Networks last week said it would cut another 5,000 jobs this year as the industry slump continues to take its toll on the firm. Nortel will cut 20,000 jobs by mid-year. Nortel also reported a quarterly loss of 12 cents per share, a penny more than analysts expected. The firm posted revenue of \$6.18 billion for the quarter, a little better than consensus analyst estimates of \$6.1 billion. "Our revenue in the quarter reflected reduced capital spending by service providers and enterprises, resulting from tighter capital markets and a severe slowdown in the U.S. economy," said CEO John Roth.

#### Accenture files IPO

Technology and management consulting firm Accenture filed for an IPO with the Securities and Exchange Commission last week. Accenture, formerly known as Anderson Consulting, did not disclose how many shares it will put up for sale or the initial offering price. In its SEC filing, Accenture said the offering could raise a maximum of \$1 billion, but a company spokesman said that figure "should not be seen as a ceiling" for the amount raised from the public markets. Investment banks Goldman Sachs and Morgan Stanley Dean Witter are the co-lead underwriters in the planned IPO.

### **NetScreen to introduce** flexible firewall/VPN

NetScreen 500 is a fast, hardware-based VPN box.

BY TIM GREENE

SUNNYVALE, CALIF. — Net-Screen next week will roll out a high-speed VPN box that will help users set up and manage multiple security domains from a single platform.

NetScreen is introducing NetScreen 500, a fast VPN box that can secure major corporate sites and whose firewall can take on the role of individual departmental firewalls, streamlining security management. NetScreen 500's firewall can be configured to enforce 25 separate policy profiles, essentially acting as independent firewalls for different groups within an organization. NetScreen calls these segments virtual systems, and they can be established with the NetScreen 500's VPN policies as well as its firewall policies. Virtual systems allow the restriction of access to network resources.

This makes it easier for companies that want to secure segments of their networks from certain internal user groups, according to Martha Young, a research director for analyst firm Enterprise Management Associates. "This can be valuable to an enterprise if you are sensitive to engineering traffic not bleeding over into human resources or keeping the remote sales staff contained within a certain part of the network,"Young says.

The device would sit between a WAN router and a LAN to firewall IP traffic and establish IP Security (IPSec) tunnels with remote PCs and VPN gateways. Traffic destined for individual virtual systems would be sorted by NetScreen 500 and mapped to the appropriate virtual LAN port on a LAN switch.

Application service provider Nupremis, a beta tester of Net-Screen 500, says this capability also lets it segment individual customers on the same device. This is a more efficient use of processing power and space than buying individual firewall appliances for each customer, or in the case of a corporation, each department, says Aaron White, chief security officer and CTO for Nupremis.

NetScreen 500 hardware is based on NetScreen's Giga-Screen ASIC, which also powers NetScreen's faster VPN/ firewall box, NetScreen 1000.

NetScreen 500 is well-suited to corporate networks or sites not using Gigabit Ethernet to access protected segments, according to Dave Kosiur, an analyst with The Burton Group. The device can pump through 250M bit/sec of IPSec, Data Encryption Standard-3 encrypted traffic, and its firewall can filter at 700M bit/sec. Its price and performance make it an attractive alternative to Cisco PIX and Nokia firewalls/VPNs, he says.

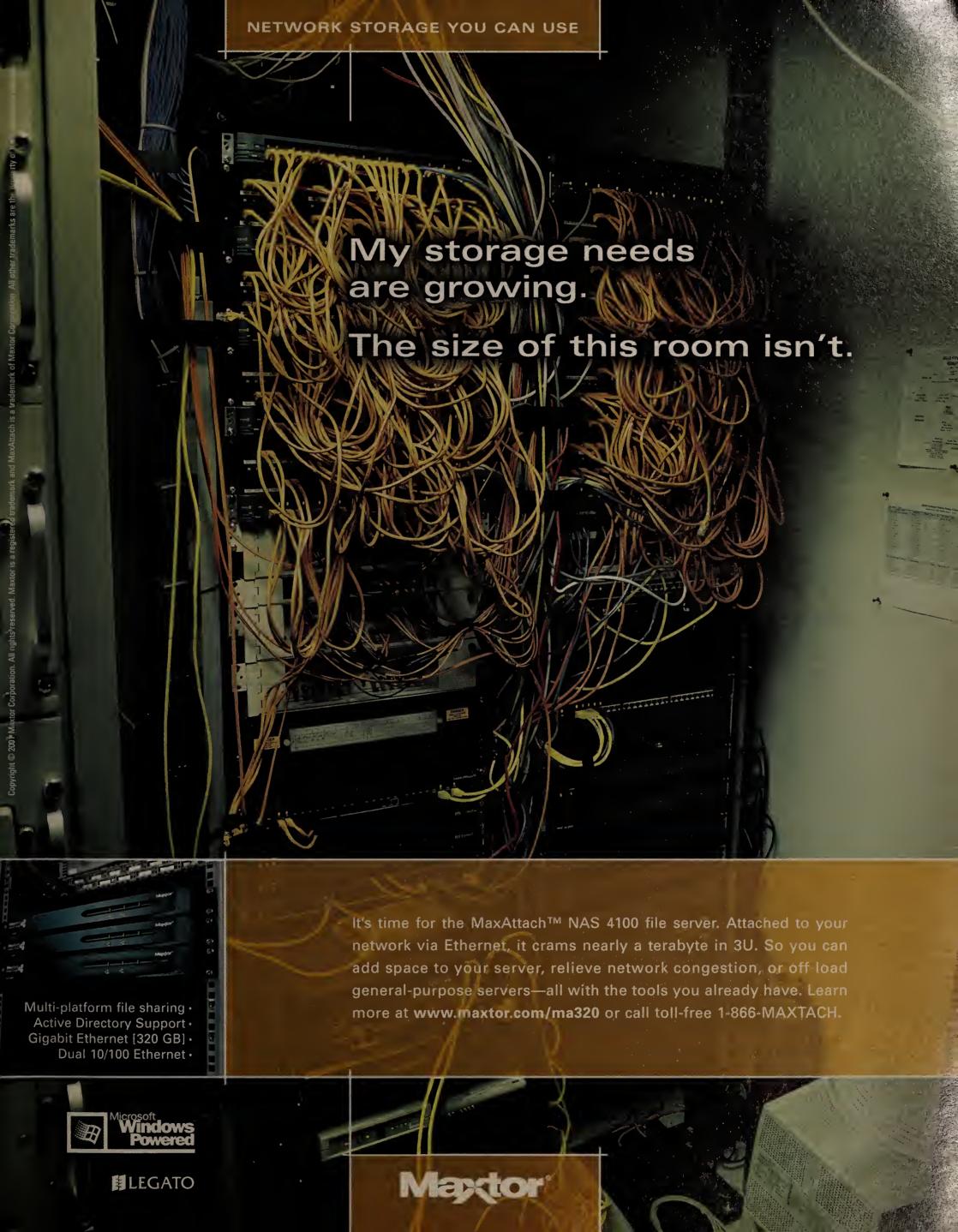
NetScreen 500 lets network designers add high-performance VPN and firewall capabilities in smaller increments than the larger NetScreen 1000 would allow, preventing potentially wasteful overbuilding of the network."The 'buildit-and-they-will-come' model just doesn't work anymore," White says.

The NetScreen chassis has four slots that can be fitted with single- or dual-port 10/100 Ethernet cards or oneport Gigabit Ethernet cards. The company is working on a two-port Gigabit Ethernet card, says David Flynn, Net-Screen's vice president of marketing. The device also can be purchased with or without the ability to impose virtual systems, supporting a range of possible customization, Kosiur says.

Up to four of the devices can be clustered to back each other up, and this summer NetScreen will add software to enable load balancing among redundant

NetScreen 500 will be available April 30 for \$25,000 to \$65,000, depending on configuration, and comes in a model for companies and one for service providers.

NetScreen: www.netscreen.



## Compuware retools apps-monitoring software

BY ANN SULLIVAN

FARMINGTON HILLS, MICH.

— Compuware next month will announce a new release of its performance management software that promises to help users root out application service problems.

The company says its Eco-

Systems suite of tools for managing, monitoring and reporting on application service levels will help enterprise customers keep key applications up and running smoothly. In Version 2.0, Compuware is adding to its existing network and server monitoring functions the ability to measure end-user application

response time, so IT managers can gauge the level of service they are delivering to their users. In addition, the suite includes an upgraded Web console that can combine data from multiple Compuware tools.

Three of the six tools in EcoSystems 2.0 perform continuous performanee monitoring from different vantage points: EeoTools, which sits on a central Windows NT or 2000 server and monitors databases and servers through remote agents that reside on NT, Unix or Novell servers; EcoScope, which is managed from a Windows console and keeps tabs on network resources and availability though probes that monitor LAN and WAN traffic; and Interval Pro, which measures enduser response time through a central Win 2000 console and performance agents that are installed on users' desktops. The Interval Pro agents track performance and report problems such as application failures or protracted transaction times that exeeed established servicelevel thresholds.

The addition of Interval Pro

to the EcoSystems 2.0 lineup lets network professionals see how an application is performing from an end user's machine. The ability to measure end-user response time is something that was missing in previous versions of the EcoSystems suite, according to Jean-Pierre Garbani, senior industry analyst at Giga Information Group. With the upgrade, Garbani says Compuware is set to compete with performance monitoring players including BMC, Lucent and Concord Communications.

Also included in the EeoSystems 2.0 suite are upgraded versions of three tools Compuware obtained through acquisitions. EcoPredictor, a capacity planning tool gained in Compuware's 1999 acquisition of CACI, predicts an application's effect on a network prior to deployment and as its usage grows. Application Expert, won through Compuware's July purchase of Optimal Networks, predicts application performance in real-world network conditions. Applieation Vantage, another Optimal gain, takes a snapshot of a transaction — such as a Web page request — and traces application bottleneeks to clients, servers or the network.

EcoChannel is the Web console that ties all the data together. In EcoSystems 2.0, EcoChannel will be able to incorporate data from Interval Pro, EcoSeope and EcoTools. Previously, only data from EcoScope was reported.

EcoSystems 2.0 is expected to ship in July. The components are priced individually, but will be packaged on a single CD. Interval Pro pricing begins at \$25,000; EcoScope is \$19,000; EcoTools is \$695 per server; EcoPredictor is \$27,500; Application Expert is \$20,000; and Application Vantage is \$35,000. There is no charge for EcoChannel.

Compuware: www.compuware.com



# Computer sabotage case returns to court

BY SHARON GAUDIN

PHILADELPHIA — The government took up the battle in court last week to reinstate a guilty verdiet for the first criminal prosecution of computer sabotage.

Tim Lloyd, 37, of Wilmington, Del., was found guilty last spring of planting a software time bomb in a centralized file server at Omega Engineering's Bridgeport, N.J., manufacturing plant (www.nwfusion.com, DocFinder: 3961). The malicious software code destroyed the programs that ran the company's manufacturing machines, costing Omega more than \$10 million in losses, \$2 million in reprogramming costs, and eventually leading to 80 layoffs.

Just a fcw months after the jury rendered a guilty verdiet in a U.S. District Court in Newark, N.J., The Hon. William H. Walls, who presided over the fourweek trial, set aside the decision. He did so after a juror who heard the case approached the court with concerns days after the guilty verdict had been handed in. (www.nwfusion. com, DocFinder: 3962)

The government was in the Third Circuit Court of Appeals contending that the District Court judge overstepped legal protocol and "abused his discretion" when interviewing the juror who came forward. Based on that, the government maintains the judge incorrectly set aside the jury's guilty verdict and sent the case back to be retried.

The defense, however, argued in front of the three-per-



Tim Lloyd, a former network administrator, was fighting the government's efforts in a Philadelphia court last week.

son appellate panel that the juror had received information outside of the courtroom that could have inappropriately swayed her decision, so the judge was correct in setting aside the verdict.

The juror at issue told Walls she was unsure whether a television news story about the LoveLetter computer virus had been factored into her verdiet, according to Assistant U.S. Attorney V. Grady O'Malley, who prosecuted the case. "Although she couldn't articulate what impact it had, she simply made the statement that she was unsure about whether it was important to bring to the court's attention," O'Malley said in a previous interview.

A written decision is expected in about a month. If the guilty verdict is reengaged, Lloyd will face up to five years in federal prison.

More on this story is available at www.nwfusion.com, DocFinder; 3970. ✓

### Wireless software gains support for Win CE

BY JOHN COX

SEATTLE — A new version of wireless connectivity software from NetMotion Wireless will run on Windows CE-based devices and include the Rijndael encryption algorithm being proposed for the federal government's Advanced Encryption Standard (AES).

The additional Microsoft support for NetMotion Mobility 2.1, due in May, arrives as some market research data show Win CE and PoeketPC finally making headway at corporate sites where users are looking for handhelds that can run full-blown applications.

The federal AES is expected to be formally completed this summer (more information is available at http://csrc.nist.gov/encryption/aes/rijndael/). The 128-bit encryption software is considered much stronger than the current Data Encryption

Standard and Triple-DES, and corrects inherent weaknesses of those techniques.

First introduced in December 2000, NetMotion Mobility is able to manage IP addresses so that a session stays intact as mobile users move between wireless LAN subnets or between wireless LANs and longdistance wireless carriers, says Shelly Julien, vice president of marketing. Today, when users move between such nets, the IP address of the device changes, and in most cases, the user's connection breaks, and the application session ends. Net-Motion is designed to keep the session alive. If a long-distance cellular network connection should drop, the NetMotion scrvcr software acts as proxy for the client, keeping the applieation session intact until the user ean redial.

Besides offering several encryption techniques, NetMo-

tion creates the equivalent of a VPN over a WAN link to the corporate firewall. The software has a battery of management applications for tracking details about client devices and their users' activities on the net, and an SNMP interface to work with net management tools such as Computer Associates' Unicenter and Hewlett-Packard's OpenView.

The software has two parts. The client code, ranging from about 300K to 800K bytes, is installed manually with a diskette, on Win 95 and 98, PocketPC and Win CE 3.0. It will run on Win 2000 computers later this year. The NetMotion Mobility Server installs on any NT server and, later this year, on Win 2000 servers.

Version 2.1 will be available in May for \$200 per user connection in groups of 25, with volume discounts available. The server software is included. ✓

### Start-up aims to shed light on network and firewall holes

BY ELLEN MESSMER

SOMERSET, N.J. — A Lucent spinoff called Lumeta has begun offering managed services aimed at assessing network and firewall vulnerabilities.

While the market for security services is getting crowded, this start-up has a couple of things going for it. First, it is led by a technology development team that includes senior scientists Bill Cheswisk and Avishai Wool, who are veterans in firewall and security research from their years at AT&T Bell Laboratories. And second, Lumeta has developed



**Wool says Lumeta's** security-assessment service simulates every possible packet a firewall could see.

Unix-based technologies for network discovery and firewall analysis that the company says can audit networks more quickly and subtly than other services can.

The Network Discovery service can map out an internal network to see whether con-

nected routers are authorized or whether there may be what Wool calls "rogue services" on the corporate network.

"We have one client that found adult Web services," he says. "And another found, to its surprise, that it was connected to a university in Asia."

Lumeta declined to name customers, except one — Microsoft.

The second of Lumeta's services, called Firewall Analyzer, looks at configurations on Check Point Firewall-1 systems and Cisco routers. In the fall, the service should be able to test Cisco PIX firewalls as well.

The service runs through vulnerability-assessment checks by trying out hundreds of millions of different routines, including checks of source and IP destinations, source port numbers and more.

It simulates "every possible packet that a firewall would ever see,"Wool says.

Lumeta's checks permit the discovcry of misconfigured firewalls within seconds by means of proprietary algorithms, he says. The company's approach does not involve networkpenetration attempts, which is common among security auditing services.

"We uncover vulnerabilities no other tool has the time or ability to look for," Wool says. "One client had a rule to allow traffic into an internal server for netnews, but misconfigured the rule so that any hacker from the outside could attack the machine. The port number was correct, but they were doing source-port filtering in a way that unfortunately supported all kinds of attacks."

Lumeta competes against dozens of companies providing vulnerabilityassessment services, such as Internet

Security Systems and Securify. But it's impossible to tell how price-competitive Lumeta is because the company won't disclose prices.

Lumeta began in October and has

30 employees. The company has \$5 million in funding from Lucent, Draper Fisher Jurvetson Gotham and others.

Lumeta: www.lumeta.com

www.powerquest.com



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PROVEN SOLUTIONS FOR STORAGE MANAGEMENT

## The Web might just be what the doctor ordered

BY ELLEN MESSMER

PHILADELPHIA - Pharmaceutical companies may have been slower than others to embrace the Web, but that's now changing at a fast pace for an industry accustomed to taking an average of seven years to bring a new drug from the clinical research phase to market.

New alliances are coming to the forc between the pharmaceutical giants — or "pharmas" as they call themselves — and the software industry to build Web portals and other 'Netenabled software for usc by doctors, corporate benefits managers, pharmacies and consumers. Some of the big drug suppliers are even setting up e-commerce venture capital divisions to fund new ways to conduct clinical research. Oth-

ers are exploring what role the Web will play in exchanging and protecting patient data, which could become more revealing based on new genetics research.

Pharmaceutical companies see the Web as a way to sell more products through doctors, who Pfizer Pharmaceuticals say typically have direct or indirect contact with 110 patients per day.

"Physicians are overwhelmed by paperwork and administrative processes," said David Hepler, a Pfizer vice president who spoke at last week's ePharma Summit in Philadelphia, where drug industry giants met to discuss the Internet's impact. He noted that physician's offices typically employ an average of 23 employees who pull 400 patient charts, make 75 calls to

#### Web recruiting for medical study volunteers

The pharmaceutical industry is using the Web to find people to test new drug therapies. Forrester Research last week cited the following as being the best "e-recruiting" sites:

- Acurian.com
- AmericanDoctor.com
- Cancer.gov
- CenterWatch.com
- · Clinicaltrials.gov
- EmergingMed.com
- Ert.com
- Healthexchange.org
- HopeLink.com
- Quintiles.com
- VeritasMedicine.com
- WebMD.com

pharmacies and deal with nine insurance payment organizations every day.

To better reach doctors who typically have an office billing and scheduling system but no outside network connectivity — Pfizer is working with IBM and Microsoft on a suite of Web-based administrative and clinical software that it plans to make available this fall.

For its part, Merck-Medco, the online prescription fulfillment company owned by Merck, is expanding its Web site services to let pharmacists and corporate benefits managers gain access to administrative information related to interactions with Merck. "We're also looking at building handheld applications for physicians to make sure the doctor can fulfill

orders online," said Jill Blank, Merck-Medco's vice president of e-commerce.

In February, Merck-Medco announced plans to form an electronic exchange called RxHub with help from hightech partners Express Scripts and Advance PCS. The three are committing \$60 million to RxHub, which is set to start this fall with Web-based scrvices, including online account team interaction and reference libraries for corporations, consumers, physicians and pharmacists

Competitor Eli Lilly, through its eLilly e-commerce venture, is brainstorming for ideas after spinning out a venture fund in January.

"We are aggressively experimenting with new ways to See Pharma, page 125

## Hewlett-Packard unveils bevy of Internet appliances

BY DENI CONNOR

With an eye toward helping enterprise customers and service providers deliver Internet content faster and more securely, Hewlett-Packard last week unleashed 19 Internet server appliances.

HP, with help from Intel and Inktomi, introduced easy-toinstall Web serving, caching, streaming, acceleration and load-balancing appliances for enterprise data centers. Users

of Intel's NetStructure devices, which the company abandoned last year, can buy the same hardware and software from HP. Net professionals using Inktomi's caching software will be able to install an HP appliance equipped with the company's Traffic Server.

HP says the server appliances would most interest customers looking to lower network management costs. With embedded software and ease-of-use functions, customers can plug the

appliances in and have them up and running in about 15 minutes. The appliances can also help administrators cope with some of the more computingintensive functions businesses must handle. For example, transactions requiring Secure Sockets Layer (SSL) technology require a great deal of processing capabilities, especially with heavy Web traffic.

Observers say HP is wise to offer products that span the content delivery market. Other vendors, such as Cacheflow and F5 Networks, offer a limited selection of products.

HP's content delivery appliances fall into several families: Web and Media Cache Server appliances co-developed with Inktomi and E-Commerce, Traffic Director, Web Hosting and VPN Server appliances rebranded from Intel's NetStructure products. HP also offers printing and storage appliances.

There are four appliances in the Web and Media Cache Server family that improve Web site performance and deliver streaming media and content to users. They can be configured as proxy, reverse or transparent cache appliances, or configured as a cluster that automatically recognizes hardware failures and compensates for them. The appliances also support RealAudio, RealNetworks and Windows Media formats. They start at \$17,000 and will be available in June.

The HP E-Commerce and Traffic Management Server Appliances speed and manage the security of e-commerce transactions. They monitor Web traffic for XML or SSL traffic and perform load balancing. The appliances consist of 1.75- or 3-inch-

high rack-mounted devices that handle from 200 to 1,200 SSL connections per second and perform Layer 4 to Layer 7 traffic management for single or multiple Web servers. They also support multiple Multi-purpose Internet Mail Extensions message types and are interoperable with load-balancing and traffic management equipment from other vendors. The appliances, which will be available in May, start at \$7,000.

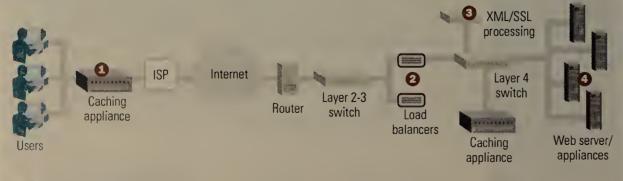
The four HP VPN appliances are rack-mounted gateway servers that provide VPN services to connect employees and customers to a corporate network. They are capable of supporting up to 10,000 simultaneous VPN tunnels per device. The 1.75- to 7-inch devices start at \$3,500 and will be available in May.

Finally, the two Web hosting server appliances include Apache Web server software, Send mail, FTP and support for Perl, PHP: Hypertext Preprocessor and Microsoft FrontPage 2000. Pricing for the Web Hosting Server Appliances, which are now available, starts at \$2,200.

The IDG News Service contributed to this story.

#### **HP's Content Delivery Appliances**

The 19 appliances HP announced last week can be deployed across the enterprise.



- 1 HP's Web and Media Cache Appliances are used by ISPs to deliver data more quickly to users.
- 2 Load balancers such as HP's Traffic Directors allocate bandwidth and route data to the Web server best able to handle it.
- 3 Data used in secure transactions may be encrypted and decrypted by HP's E-Commerce Server Appliance.
- Finally, HP Web Server Appliances can keep heavy Web traffic from bogging down servers.

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## **Qwest offers to manage content delivery**

BY MICHAEL MARTIN

DENVER — Qwest Communications enhanced its Web hosting offerings last week by introducing managed content delivery services that counter recent moves by Akamai, a leading content delivery network provider.

**Qwest's Intelligent Content** Environment services are designed to help companies more effectively deliver content within enterprise networks and beyond (see graphic). By offering managed services, Qwest's aim is to help customers keep capital expenditures down and off-load management chores.

Qwest's services, based on the carrier's IP backbone and an assortment of content-aware routers and switches from Cisco, are rolling out more than a year after Akamai and others pioneered the content delivery market. But Qwest will try to differentiate itself by offering a bundle of Web hosting and managed content delivery services.

The new services, which will be supported by a core of eight large data centers, are largely aimed at preventing Qwest Web hosting customers from giving more money to Akamai, says IDC analyst Melanie Posey.

"Akamai would be taking money out of Qwest's pocket," Posey says.



Akamai's EdgeSuite services, introduced last year, let firms serve dynamic and static content over Akamai's network. Prior to the introduction of EdgeSuite, Akamai's net could handle only static content dynamic content was handled by Web hosting firms.

Qwest's content delivery network may not reach all the locations covered by Akamai's, which spans 9,700 servers across 56 countries. But Qwest officials say it should reach most areas where a customer would want to serve content.

"You have to question whether the extra cost of having a server collocated with every Tier-3 service provider in the country is justified by

the small audience those Tier-3 providers add," says Rod Nayfield, director of IP inno-

#### Content delivery suite

**Qwest's Intelligent Content Environment services** include:

**Owest Content Switching:** For load balancing traffic across servers at multiple locations and providing fault tolerance.

**Owest Internet CDN:** 

A service that supports the delivery of static and rich media over Owest's IP backbone and across eight data centers.

**Owest Enterprise CDN:** A service that will provide content within a corporate network.

vations at Qwest.

Qwest Content Switching, a load-balancing service, is available to Qwest Web hosting customers. Pricing will vary depending on volume, but will be below \$1,400 per content switch per month.

Qwest Internet CDN, for distributing static and dynamic content, will be available June 1. Prices will depend on the amount of data transferred, and will be under \$1,200 per megabit/sec.

Qwest Enterprise CDN, slatcd for availability in the third quarter, will use dedicated distribution points within a client's enterprise network to serve static and dynamic content. Pricing has not been set.

Qwest: www.qwest.com

## Akamai to help track Web site visitors

BY JENNIFER MEARS

CAMBRIDGE, MASS. - Akamai is offering a new service to meet the needs of companies thinking about moving traffic out of centralized data centers, but unsure how they'll track Web site usage on distributed networks.

The content delivery service provider is teaming with NetIQ, which acquired WebTrends earlier this year, to offer SiteWise, a service that lets users track and analyze Web site visitors. Site-Wise is based on NetIQ's Web-Trends Live (www.webtrends live.com) technology, which is a fully managed, hosted service that provides real-time reports on visitor behavior and preferences.

Instead of analyzing server log files, the WebTrends technology gets information directly from the visitor, says Jeff Seacrist, product line manager for NetIQ. Users add a line of Java code to their Web sites to trigger the data collection, he says, making analysis on a distributed network easier.

Akamai, for instance, uses 650 telecommunication networks to support some 9,700 servers in 56 different countries. Content is distributed across the network and served from the closest servers to the user.

Information such as where visitors come from, which parts of the site they frequent and how long they stay is sent to servers in a NetIQ data center and turned into reports. No personal information is collected, Seacrist says.

Akamai's SiteWise customers can access more than 100 types of reports through the Akamai customer portal, which also gives them real-time access to other Akamai services.

Most content delivery networks offer geographical and performance-related reports, but analysts say Akamai is going a step beyond with SiteWise by giving users access to customerfocused analysis.

McAfee.com CIO Doug Cavit is an Akamai customer who also uses WebTrends technology. Akamai parses log files for him to feed into his Web-Trends application server. "Certainly the concept of being able to have them give us analytics in a way that we don't have to do it ourselves is compelling," he says.

His concern is that real-time analysis, such as that offered with SiteWise, could impede his site's performance because of the hundreds of thousands of visitors it receives each day. Sometimes visits can top one million, he says, and transferring real-time data could create a bottleneck. Most sites, however, wouldn't face that problem because they don't handle as many visitors, Cavit says.

Greg Howard, principal analyst at the HTRC Group, says the SiteWise service is a natural complement to Akamai's Edge-Suite services, which can deliver not only static content, but also dynamic pieces, such as streaming media, from the edge of the network.

Enterprise customers can expect other content delivery networks to begin offering business intelligence services, says Guy Creese, research director of Internet analytics at Aberdeen Group. He says a service such as SiteWise is a big step toward integrating all the pieces in a content network. The analytical piece will let companies see how their Web sites are being used and decide what makes sense to push out into a distributed environment.

The SiteWise service, which is available immediately, can be used as part of Akamai's Edge-Suite service or can be purchased separately. A spokeswoman says the cost ranges from a few thousand dollars per month to tens of thousands of dollars per month.

Akamai: www.akamai.com; NetIQ: www.netiq.com

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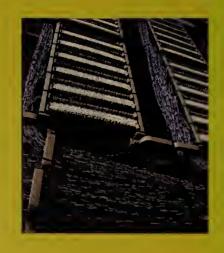
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## SANavigator boosts storage mgmt. pkg.

## Briets

Stratacache announced the Axcela, a rack-mounted device that uses Volera's Excelerator technology and works with Novell's e-commerce package, iChain, to cache and authenticate data and off-load cryptographic processing.

Axcela will be available in May in three configurations: 1.75-inch, 3.5-inch and 7-inch boxes that support 512M bytes to 4G bytes of memory.

Each Axcela supports up to four processors, which off-load cryptographic processing from the CPU and authenticate user requests to the network.

The Axcela can be configured as a fully redundant pair or in a cluster server configuration. Axcela starts at \$7,300.

Stratacache: www.strata cache.com

Storage vendor CNT launched two routers at Storage Networking World earlier this month in Palm Desert, Calif., that will support Fibre Channel over IP, iSCSI and InfiniBand

The UltraNet Edge Storage Router will send data from servers over a Gigabit Ethernet network to storage devices, bridge storage-area network (SAN) islands and work with the upcoming high-speed bus specification, InfiniBand.

The initial router, the UltraNet 1000, will bridge SAN islands over the IP network. It has four ports that can be configured as Ethernet or Fibre Channel.

The second router is the UltraNet 2000, an iSCSI router, which transports native SCSI data from the host system to a storage device and vice versa.

The UltraNet Edge Storage Routers will be available the second quarter of next year. Pricing starts at \$25,000.

CNT: www.cnt.com

BY DENI CONNOR

ANavigator is enhancing its storage resource management software, which lets network professionals eliminate performance bottlenecks by helping plan, configure and monitor storagearea networks.

SANavigator 3.0 adds three features: performance monitoring, a SAN planning tool and remote access from a Palm handheld. It has been redesigned from a monolith-

ic Java program to a client-server architecture, which frees up memory on management workstations and installs more easily.

The performance monitoring feature lets storage managers click on any link between two devices and show how much bandwidth is being used by data transferred between the devices. Network professionals can set thresholds on links, which when exceeded will trigger alerts to e-mail, a pager or to a systems and network management framework such as Computer Associates' Unicenter TNG. The performance monitor also lets storage managers perform a ping on two Fibre Channel devices to see the latency between the two devices.

PROFILE: SANAVIGATOR

Location:	San Jos <b>e</b>
Founded:	March 2001
Product:	SANavigator storage resource management software.
Management:	Robert Wright, president
Financing:	Western Digital
Employees:	75
Competitors:	Astrum Software, TrelliSoft, Sun/Highground
Fun fact:	There are no employees with founder's stock, so officially the company has no founders.

SANavigator, the company, was spun out last month from Connex, which started as a subsidiary of long-time adapter vendor Western Digital.

The company's product, SANavigator, discovers storage devices from a variety of vendors and the connections between them in a SAN. It supports switches from Brocade, Vixel, McData, QLogic and Gadzoox, and host bus adapters from JNI, Emulex and QLogic.

"SANavigator lets you grab bandwidth numbers off of your SAN fabric and lets you determine how slowly devices are running or not running," says Hoot Thompson, CTO for integrator Tatuxent Technology Group in

Columbia, Md. "You're setting up a Fibre Channel network to deliver data at a certain rate. If you are not doing so, you want a quick way of finding that out in a manner that you can dig in and find out whether it's the fabric, the client or the storage device."

The SAN planning tool is a Microsoft Visio-like design utility that lets network professionals create, configure and document SANs electronically and export the drawings to another interface such as Visio. The SAN tool

also lets network managers perform rules-checking to identify single points of failure.

SANavigator can be remotely monitored via Palm devices.

Gartner projects revenue for the storage resource management software market to grow from \$4.2 billion in 1999 to \$14.7 billion in 2004.

SANavigator is priced by the number of switch or router ports. A version for a SAN with 32 Fibre Channel ports would be \$7,500. SANavigator is shipping now for Windows NT, Windows 2000, Linux Red Hat 6.2, Solaris and Hcwlett-Packard UX.

SANavigator: www.sanavigator.com

## Aether unveils building blocks for wireless apps.

BY JOHN COX

OWINGS MILLS, MD. — The new software announced by Aether Systems last week is an ambitious attempt to simplify the work of letting sundry handheld devices wirelessly connect with existing corporate data.

Aether Fusion is intended as a set of building blocks that plug into a core server program that runs on Java applications servers. It will blend several Aether products including its AIM messaging middleware and ScoutSync data synchronization program. Users can then select the set of blocks that match their back-end applications, wireless nets and client devices.

If Aether is successful in stitching together these various components with new APIs, enterprise users should be able

to link handheld users faster than before with critical corporate data, customer orders, inventory systems and accounts receivable, instead of just personal contact and scheduling information.

Traditionally, wireless applications are custom projects, costly and time consuming, says Warren Wilson, wireless practice director for consulting company Summit Strategies.

"Fusion defines wireless development in layers, connected by standard APIs, with software modules in each layer," he says. "These just snap together. In theory, customers can specify their application needs, and Aether can just 'go to the shelf' and pull out the right set of modules to satisfy them."

(After being briefed by Aether, Summit agreed to write, and be paid for, a white paper about Fusion, now published on the Aether site.)

There are some available packaged See Aether, page 22





#### hp storage disaster recovery

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How you'd explain it to a clumsy antique shopper: Don't worry about the one-of-a-kind Ming vase you just dropped, we've got another in the back just like it.



## VA Linux expands network storage appliances

BY DENI CONNOR

FREMONT, CALIF. — Users will be able to more quickly integrate and expand network-attached storage with a highend, embedded Linux appliance that VA Linux introduced last week.

The VA Linux 9450 is a NAS appliance that lets users consolidate storage from a variety of servers on the network. The NAS appliance, with a capacity of 180G bytes to more than 6 terabytes, can be easily expanded as storage needs grow, the company claims.

The VA Linux 9450 NAS appliance supports Linux, Unix, Windows 2000 and Macintosh operating systems, letting those users transparently access files stored on the device. It also supports HTTP and VA Linux's NetAttach (VANA) storage operating environment. The machine comes with free software upgrades and customer support.

Analysts say the demand for increased storage capacity, faster systems and lower cost of ownership is driving the need for faster, less complicated storage devices.

"We are in the process of migrating from a large distributed net-

work, including all of our shares, groups and e-mail folders, into this NAS system," says Mark Thoreson, a manager at federal reseller GTSI in Chantilly, Va. "The VA Linux box lets us consolidate all these files and duplicate space into a centralized environment we can manage more easily."

GTSI has more than one terabyte of data stored on servers around its offices.

Thoreson chose VA Linux because it gave his network the



VA Linux's NAS 9450 is a rack-mounted device that offers up to 6.6 terabytes of storage capacity.

necessary performance and scalability. "The VA Linux NAS was about 40-plus percent less than Network Appliance's [file server] and 80% to 90% less than EMC for the amount of storage," he says.

With the 9450,

VA Linux is gunning for Network Appliance. According to company claims, the 9450 competes in the NAS market with Network Appliance's NetApps 840 file server.

"VA has a shot at commoditizing NAS because [it] offers all the important file protocols — [Network File System, Common Internet File System,] HTTP and AppleTalk — at no extra cost," says Bill Claybrook, an analyst with Aberdeen Group.

"With Linux on the NAS itself, VA has the potential to offer considerable [features] compared with Network Appliance's and EMC's Celerra products. On the other hand, the company has to serve up data at sufficiently high rates to compete with these pared down operating systems or else they will not succeed," Claybrook says.

VA Linux acquired storage vendor NetAttach last year. VANA includes a status monitor that lets customers centrally manage all the NAS devices attached to the network and a "phone home" feature that alerts the customer and the VA Linux Alert Monitoring Center before trouble occurs, the company says.

VANA also supports snapshot back-up capability, in which images of the network data are taken at different points in time, thereby maintaining the integrity of the data. It also adds a Logical Volume Manager, SNMP management support, the Ext3 journaling file system, Open Network Data Management Protocol for LAN-free backup, single sign-on and access to Windows NT domains.

The VA Linux 9450 NAS has hot-swappable, redundant power supplies and fans. It sells for less than \$30,000 for 180G bytes of storage and is available immediately.

VA Linux: www.valinux.com



Aether,

continued from page 19

middleware products that combine interfaces to some groups of back-end applications with support for various client devices, and a plethora of wireless development products from companies such as 724Solutions, 2Roam, ThinAirApps, AppForge and others. But few offer the range of capabilities planned for Aether Fusion, along with Aether's billion-dollar cash reserve and experience in building wireless applications, according to Wilson.

Fusion will be available in two ways. Aether will use Fusion to create hosted applications for its customers, paid for by monthly fees. Or customers, systems integrators and value-added resellers can pay for a traditional software license, install Fusion and develop applications on it.

The software consists of five groupings of components.

Data adapters move data in and out of Open Database Connectivity-compliant databases or to specific enterprise applications such as SAP R/3 or others. The adapters communicate via the Simple Object Access Protocol with the second group of components, called services.

In this group are data synchronization, data streaming for

video and voice and text-tospeech conversion.

The services run on the third group of components, called the core. These are a set of server programs, written in Java, on top of BEA Systems' WebLogic Java application server. Included are authentication and other security programs, network management and session management. The fourth group is communications adapters, which connect the core to an array of local and wide-area wireless nets: 802.11b, Cellular Digital Packet Data, Mobitext and many

Finally, there are components that can run on various client operating systems, such as Palm OS, PocketPC and Windows CE. Some devices, such as handheld computers or PDAs, might get a client analog of a communications adapter, so Fusion can optimize the specific network connection used by the device.

Fusion will be released this summer, and feature new mail and mobile collaboration services, new adapters to support instant messaging and Lotus notes. Existing users of Scout-Sync, AIM and Aether's Market-Clip brokerage application will be upgraded automatically when Fusion-based versions of these programs are released.

Aether: www.aethersys tems.com

### Red Hat offers software assistance

BY SAM COSTELLO

Red Hat last week announced a service to simplify the administration of systems running its software, as well as a new release of its operating system.

The service, called Software Manager, is included as part of the standard installation in the new Red Hat Linux 7.1 and lets IT managers receive customized information about each computer on their networks, including virus alerts, notifications of bug fixes and software updates. The program will let managers remotely view the software configurations of each system and install or remove software. Software Manager can be manually configured over the Web or through an automated feature included in the operating

As more devices are connected to corporate networks, IT managers' time is becoming more valuable, says Marty Wesley, product manager for Red Hat Linux. Software Manager offers IT managers easier, more efficient administration and lets them support more machines using the same resources, he says. Red Hat expects the service will be used most by midsize companies that need the kind of support offered by the service, but can't afford to hire enough IT staff to handle it themselves, although large companies and even individuals will also use it, he says.

Software Manager will be a \$20 per PC, per month subscription service, although it is available at the special price of \$10 per PC, per month until Sept. 1.

Software Manager is the first service to be offered through the Red Hat Network, a technology that enables delivery of scrvices and applications to computers running the Red Hat operating system, Wesley says. The Red Hat Network will eventually offer customers options such as subscriptions to their favorite applications, he says, which would, like Software Manager,

provide them with bug fixes and updates as those become available.

Red Hat also announced the release of Red Hat Linux 7.1, the latest version of its Linux operating system. The operating system is built around the new 2.4 kernel and offers improved symmetric multiprocessing support, new configuration tools and a new installation interface.

The software is available at Red Hat's Web site and will be in retail stores tomorrow.

The operating system is offered at three price levels: \$40 with technical support and Software Manager included for one system for 30 days; \$80 for technical support and five Software Manager licenses for 60 days; and \$180 for support and 10 Software Manager licenses for 90 days. Red Hat Linux is available as a free download at the company's Web site.

Costello is a correspondent with the IDG News Services' Boston bureau.





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#### Infrastructure



Wired Windows . Dave Kearns

### WE COULD ALL DO WITHOUT THIS KIND OF SPAM

n last week's Backspin column (www.nwfusion.com, DocFinder: 3944), Mark Gibbs promised not to speak about spam in this week's issue. I will step in to supply your weekly requirement of antispam material.

Last week there appeared in my inbox, in 256 lovely colors, a piece of HTML marketing junk mail from someone who wanted "to make [my] job easier." Aha, I thought, a ghostwriter! Sadly, no. Turns out the person wanted to help me with my "IT responsibilities, [my] daily network challenges and all [my] enterprise desires." Too bad I don't have any IT responsibilities anymore, and my only enterprise desire is to be bigger than Microsoft.

How did my name get on the list? According to my correspondent, "I noticed you've looked into eSecurity or cross-platform Network Management before." Quite possible, because those are two areas I write about. I actually got this rather large missive because I attended Novell's BrainShare conference last month.

Turns out just about everyone who went got it — whether you were an IT manager, consultant, analyst or member of the press.And, unlike those spams that say you'll only get one mailing, this one promises "a monthly e-mail individualized to your networking interests." Too bad they've no way of determining my network interests, but that never stopped a marketing executive before.

Novell did use a real name when sending the spam: "My name is Sandi Terry, and my job at Novell is to find ways to make your job easier." There is a Sandi Terry at Novell (seterry@novell. com), the "Manager, North America Demand Creation." The only demand this note should create, though, is a demand to remove my name from the list.

According to the distribution house that created and sent the spam (Invision Consulting Services — www.invisioncs.com), it only uses so-called "optin" addresses — people who have actively indicated they wish to receive marketing e-mail. Unfortunately, the BrainShare registration didn't involve an "opt-in" option, nor was there an "opt-out" option.

I didn't mind when the (text-based) messages I kept getting were simply hyping BrainShare activities. I knew they'd stop once the show was over. I didn't expect, though, to be subjected to monthly marketing hype done up in virus-susceptible HTML e-mail from a company like Novell. Even Microsoft never stooped so low as to spam me.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.





Briefs

# Net.Worker

Products, services and strategies for tying teleworkers to the enterprise

## Small businesses warming to 802.11b

BY TONI KISTNER

Symantec recently released AntiVirus 2001 for the Palm OS, a unity that scans for and detects viruses in Palm devices. It protects data even between synchronizations, and when you

Symantec: www.symantec store.com

costs \$40.

open an application, beam files,

navigate the Web or synchronize data with a PC. AntiVirus 2001

The Home Phoneline Networking Alliance (HomePNA) announced the approval by the International Telecommunication Union of a technical specification for a worldwide standard for home phone line networking. The move could pave the way for deployment of 1.0 and 10M byte/sec HomePNA products, including preconfigured PCs, network interface cards, broadband modems and gateways, and home network chip solutions.

HomePNA: www.homepna. com

To power its iPAQnet Mobile Internet service, Compaq has teamed with WorldCom which uses the Ricochet wireless network - to offer wireless connectivity for its iPAQ Pocket PC, Presario 800 and Armada notebook PCs.

Compaq: www.compaq.com

Belkin, the household name in cabling, surge protectors and uninterruptable power supplies, is getting into the small office/home office network business with a line of 10/100M bit/sec Ethernet network interface cards and Universal Serial Bus Ethernet adapters. The **Desktop Network Interface Card** sells for \$25; notebook PC Cards are \$49 and \$60; and the USB Adapter costs \$50.

Belkin: www.belkin.com

he 802.11b may never become a household name, but it's not just for the enterprise anymore, either.

As costs come down and ease of use improves, small businesses are discovering they can bypass wired Ethernet LANs, as well as extend network connectivity to the home, client sites and public spaces such as airports and hotels. And vendors are responding. Having gained a strong foothold in the enterprise — with a 20% penetration today — 802.11b vendors are now turning their attention to the small office market.

It's understandable that vendors such as 3Com, Cisco and Agere Systems

(formerly Lucent Microelectronics Group) didn't see the small office as easy pickings right away. Wireless connotes mobility. Why would 10 people who spend all day in a single office need mobility? But in the small office, it's not the individual workers who are mobile, but the office itself.

"Small offices tend to be dynamic as far as size and location," says Ron Seide, product line manager for Cisco's Wireless Networking business unit. "They're small but growing and tend to move around a lot. With a wireless LAN infrastructure, when the office moves, the infrastructure can be loaded up, taken to the next location, then rapidly redeployed, maintaining connectivity and the customer's investment."

While Gartner predicts 802.11b penetration in the corporate LAN will reach 50% by the end of next year, Gartner analyst Mostafa Maarouf sees 802.11b technology heading into the smaller markets quickly. Today, Maarouf says, 20% of notebook PCs are sold into small offices of up to 19 people. "That's low, but not insignificant," he adds. What's more, by 2005, Gartner predicts that 95% of notebook PCs will be 802.11b-enabled.

"Compared to wired Ethernet, which is expensive when you include the wiring, 802.11b is a pretty compelling alternative for eight or 10 people," Maarouf says.

In shopping for 802.11b hardware, ease of use and price are most important for See Small businesses, page 28

Small office 802.11b products at a glance

802.11b compliance lets you mix and match vendor hardware. Here's a sampling of hardware products available today and coming soon:

Agere Systems www.orinocowirele	ss.com	
PRODUCT	PRICE	
AP500 Access Point	\$895	
RG 1000 Residential Gateway	\$349	
Orinoco PC Cards	\$149	
ISA and PCI cards	\$69	
USB adapters	\$189	
Cayman Systems		
PRODUCT	PRICE	
Cayman Broadband Gateway 3220 H-W	\$599-\$69	
Price set and subsidized by service provider.		

Cisco	
www.cisco.com	
PRODUCT	PRICE
Cisco Aironet 340 Series Base Station, Model AIR-BSE342	\$399
Cisco Aironet 350 PC Card	\$249
PCI card	\$339
	_
Netgear	
www.netgear.com	
PRODUCT	PRICE
ME102 Wireless Access Point	\$355
MA401 PC Card	\$180
MA301 PCI Adapter	\$61

SOHOware www.sohoware.com	
PRODUCT	PRICE
CableFREE Netblaster II Access Point	\$249
CableFREE NetBlaster II PCI Card	\$199
CableFREE NetBlaster II PC Card	\$149
3Com www.3com.com	
PRODUCT	PRICE
3Com Home Wireless Gateway	\$339
11M bit/sec Wireless LAN Access Point, available in May	N/A
11M bit/sec Wireless LAN PC Card	\$219
11M bit/sec Wireless Ethernet Client Bridge	\$279

## Telework ranks expected to double in three years' time

Report sees strongest growth in large and small business sectors.

BY TONI KISTNER

What's your company's telework policy? A recent report from Cahners In-Stat shows policies — as well as attitudes toward full-time telework in general range significantly among the small office/home office, small business, midsize and enterprise markets.

In the SOHO and small business markets, only 34% in the SOHO segment said they hire employees knowing they'll telework full time. In the small business market, 50% hire full-time teleworkers.

In midsize businesses, about 54% expressed a willingness to hire full-time teleworkers. Similarly, in the enterprise, 50% of firms hire full-time teleworkers.

Who provides the equipment and manages expenses? In the SOHO market, 60% of IT decision-makers said their companies provide teleworkers with equipment, but only 33% said they reimburse teleworkers for home office expenses, such as

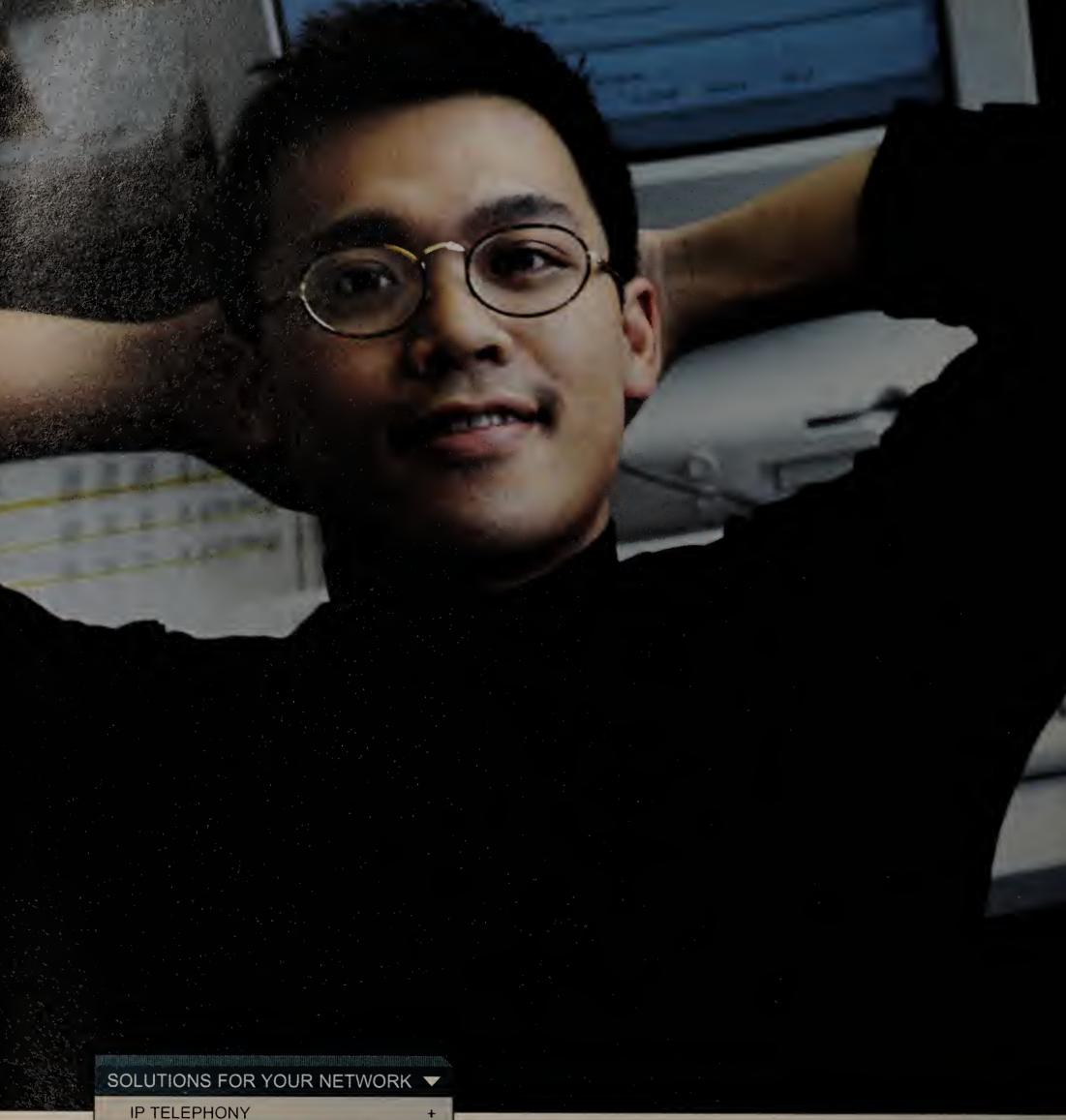
office supplies or a phone line. In the small business market, 80% said their companies provide equipment and 66% said they reimburse for home office expenses.

In midsize companies, 68% provide the equipment and 54% reimburse expenses. In the enterprise, the numbers climb even higher, with 85% providing equipment and 62% reimbursing for home office

The report, "Entering the Access Era: U.S. Telecommuter Demographics & the Impact of Fragmentation on IT Platform," also predicts strong growth in part-time and full-time telework across all sectors, but particularly in the small business and enterprise.

Last year, there were 19 million Internet-accessing telecommuters, both full and part time. By 2004, Cahners predicts that number will jump to 39 million workers.

Sixty percent of teleworkers last year See Ranks, page 28



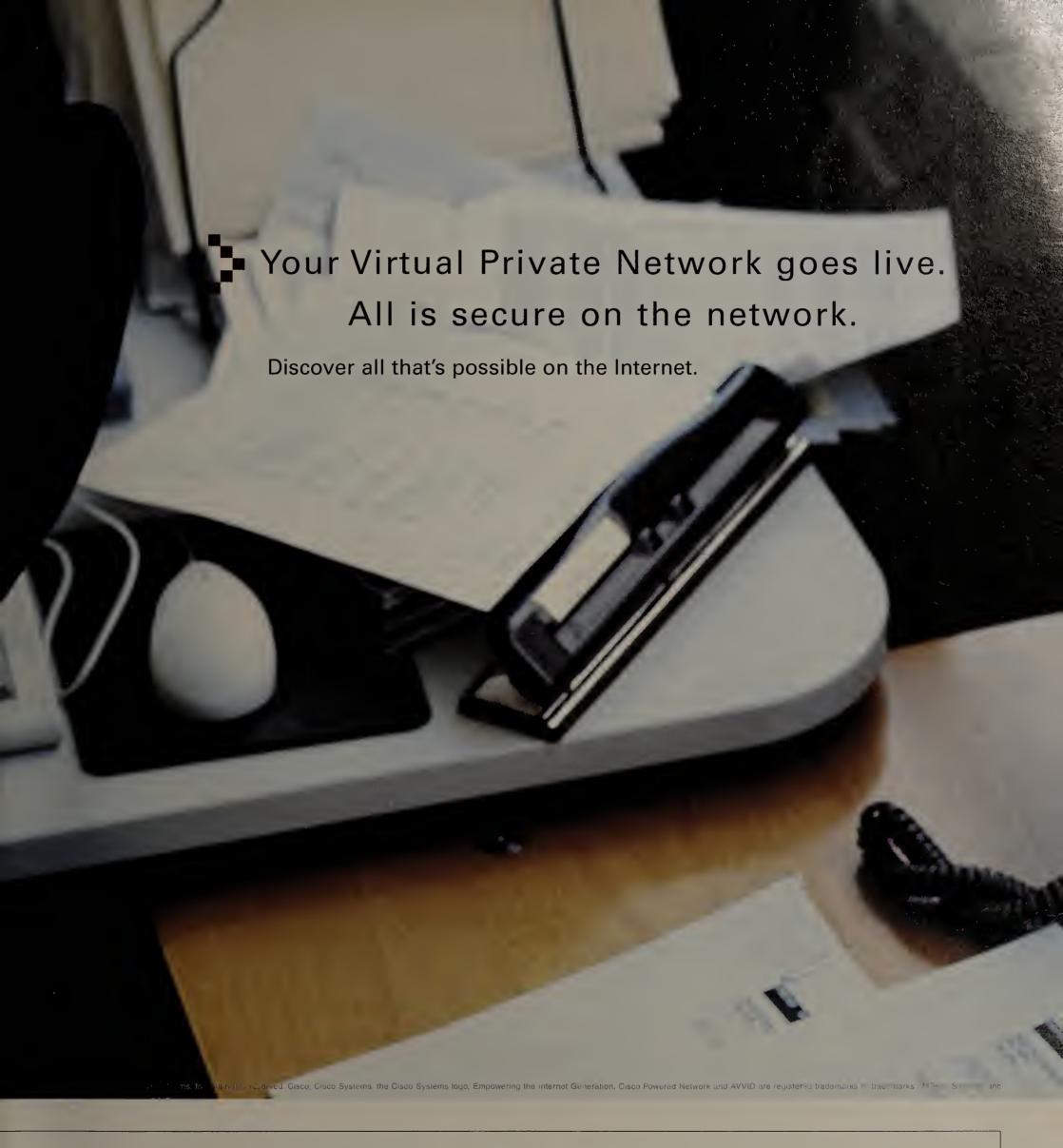
IP TELEPHONY	+
VPN/SECURITY	
CONTENT NETWORKING	+
OPTICAL	+
STORAGE NETWORKING	+
MOBILITY	+

#### cisco.com/go/vpnsecurity

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VPN Savings Calculator

Case Studies



any disruption. This standardized enterprise architecture allows you to seamlessly integrate voice, video, wireless and data applications on a single, scalable network. This includes new and existing technologies alike. Whether you're building your enterprise network or extending it with Cisco Powered Network™ services, take advantage of the tools below to get it done right.





#### Telework Beat . Toni Kistner

### Home networking (finally) takes hold

re we there yet? Yes, finally. After a string of disappointing years, in 2000, the home network equipment market increased by 97% to reach \$290 million, according to Cahners In-Stat.

It took its time, that's for sure. Wired Ethernet has been around forever, but it was generally assumed that home workers would never tear up the walls to snake cable. So when the alternate technologies came along in the past few years — home phone line, wireless and AC power line — it seemed like a sure bet. But consumers wanted to share broadband and didn't care about sharing files and printers. So neat products sat on store shelves waiting for broadband to take hold. Now that it has, the real fun begins.

While phone line and AC power line standards battles are over, the wireless standards between HomeRF and Wi-Fi (802.11b) rages eternal. In our April 9 issue, we ran a Face-Off between Wi-Fi's Dennis Eaton and HomeRF's

Wayne Caswell (www.nwfusion.com, DocFinders: 3945, 3946) with an accompanying online forum (www. nwfusion.com, DocFinder: 3947). Trouble is, the technology debate is deadtired old. But if you're looking for entertainment or want to join the fun, check out the forum. There's blood all over the walls in there.

HomeRF is dead, but like a zombie, it doesn't seem to know it. Industry zealots go on and on about voice codecs and how superior the technology is for residential use. Even if it were superior (and how many of us can really understand what the heck these radio engineers are arguing about?), who cares? HomeRF proponents have promised higher speeds and industry support for years. Reality is, the technology is stuck at 1.6M bit/sec, and no one's selling product but Proxim and maybe Siemens. Isn't this getting a little embarrassing, guys?

Wi-Fi has widespread industry support and products in the channel. Its

prices are coming down (and are less expensive than HomeRF gear), and ease of use is improving. Vendors such as SOHOware, Linksys and D-Link are selling affordable 802.11b hardware. 3Com and Cisco are targeting the small office/home office market with improved documentation, install wizards and extended support hours. Isn't it obvious that because we want to work from anywhere, we'd want to use one wireless LAN technology?

Heck, even Microsoft gets it by announcing 802.11b support for its upcoming Windows XP. Not support for both, mind you, just 802.11b.

Carl Stork, general manager for Windows hardware strategy, said in an interview posted on the Microsoft site: "Because 802.11b is robust, it's also going to be the logical technology for wireless networks in the home, for people who bring their laptops home from school or work. And there's great support for this kind of usage, includ-

ing automatic configuration built right into Windows XP." Sounds like Microsoft hopes to sell more XP by touting 802.11b support.

In other home network news, the Cahners numbers reveal that folks are still buying wired Ethernet like crazy. The market grew 135%. But home phone line products aren't flying off the shelves the way we thought they would two years ago. That is partly because folks are buying something else — such as wireless or Ethernet. But look around your house, in your office. How many phone jacks do you have? How many power outlets to do you have? Are they in close proximity?

It'll be neat to see how the market responds when the first Home Plugspecified power line products hit the shelves next year. If they work, Home-PNA could share HomeRF's fate.

Kistner is managing editor of Net. Worker. She can be reached at tkistner@nww.com.

#### Small businesses, continued from page 25

the small office. You'll also want to consider security and management features, and performance. While you won't get the throughput speeds of wired Ethernet, 802.11b's 11M bit/sec rated speed (about 6M bit/sec in actuality) is plenty of pipe for a 10-person office connected via DSL or analog modem.

Do you want a broadband

gateway, an access point or a base station? A broadband gateway typically is a router with multiple Ethernet ports that connects to your DSL modem or may have the modem integrated within. It will include 1P management, VPN pass-through, Dynamic Host Configuration Protocol server and other network features. In contrast, an access point connects to the DSL modem or hub via Ethernet wiring (Category 5 cable) and

allows for roaming, which is typically overkill for the small office. More appropriate is a base station or residential (or broadband) gateway. A base station typically supports a 10-person office, but doesn't support roaming. It's substantially less expensive than an access point, as it doesn't require the additional processing power roaming requires.

Access points and base stations include at least one Ether-

net port for connecting a DSL or cable modem. You can add an Ethernet hub and connect via wiring a printer, scanner or file server, or use 3Com's Ethernet Client Bridge to bring peripherals onto the network. The 802.11b adapters — PC Cards, ISA and PCI cards, and Universal Serial Bus devices — range in price, but because they're interoperable, you can mix brands.

Other questions to ask: What are the vendor's plans for migration to higher speed LANs? Does the product support power over Ethernet, which means you don't have to run power to the access point?

When it comes to configuration software and firmware, all the vendors vying for small office customers tout ease of setup and use. But vendor philosophies vary. instance, 3Com has stripped many of the enterprise network management capabilities out of its small office product, including SNMP. In contrast, Cisco left the highend management features in, assuming the company might use a value-added reseller for support. However, those features are layered behind a Web-based interface that was built for nontechnical users.

"Two years ago, we were tar-

geting the CTO or IT professional within the enterprise," says Agere's Alan Scott. "Today we assume it'll be the end user installing the system. So we geared our call center to that type of customer, added lots of documentation and improved the install wizards."

John Hyland, CEO of Morristown Financial Group,located in New Jersey, set up his company's wireless LAN in 1996 using Lucent WaveLAN equipment. A pending move put the company in a bind. "We couldn't live without a network but didn't want to dump the money into wiring when we knew we were moving to a new office in six months," Hyland says.

So when Hyland relocated the group, he simply unplugged the equipment, then plugged it back in at the new building. Today, using a mix of WaveLAN and Orinoco equipment, the company has an access point connected to a hub to share a 1.5M bit/sec DSL connection and two laser printers among 16 employees using a mix of desktops and notebooks.

"It's been more than adequate," Hyland says. "We don't know what we don't know. We're just comparing it to nothing."

#### Ranks, continued from page 25

were employed by small businesses, while about 58%, or 3.9 million, teleworked one or two days a week.

Last year, 35% of teleworkers at small businesses were full time. The number of full-time Internet accessing teleworkers is expected to increase roughly 25% annually from less than seven million last year to 18 million in 2004. Full-time telework is less common in the small business and middle markets, accounting for only 2% of their total workforces.

Last year, 32% of all teleworkers were full time. By 2004, that number is expected to jump to 52% and account for 9% of the

total enterprise workforce, or 4.7 million teleworkers.

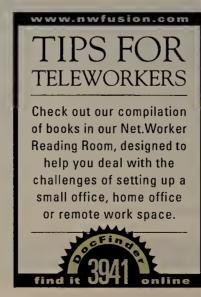
The enterprise is expected to see the most dramatic growth in full-time telework. Large firms accounted for 24% of full-time teleworkers last year.

Kneko Burney, a Cahners analyst and author of the report, points to employee recruitment as one of the major contributors to the rise in full-time telework.

"We found in a lot of cases companies want highly skilled, steady and experienced people — who're already established in a life," Burney says.

"These folks often aren't interested in more money or stock. Once you reach that level, it's a lifestyle choice. They want to work from home or the office or wherever. And

once you find people who are qualified who you can afford, it's a lot easier to let them work from home. Relocation is a big risk — what if they don't work out?" he asks.



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## New rules haven't eliminated slamming

Increased penalties seen as a long-term answer to annoying problem.

## Briefs

The Federal Communications Commission's 700-MHz spectrum license auction will likely be postponed again. President Bush's budget proposal for 2002 recommends the auction be delayed until 2004. A prime reason for the recommended delay is that television stations are currently using the spectrum to send analog signals; they are required to move to a digital broadcast system by 2006 Another reason is that potential 700-MHz license owners would not pay as much for the licenses today as they would in a few years, analysts say.

The news at PSINet only gets worse. The ISP last week announced dismal year-end 2000 financials that include a \$5 billion net loss on service revenue of \$786 million. PSINet also said it could run out of cash by the end of the month. The ISP has received notices of default on a \$68.1 million equipment lease. Earlier this month the company's stock was pulled from Nasdaq.

Broadband service provider Winstar Communications last week voluntarily filed for Chapter 11 bankruptcy protection. The company also initiated a \$10 billion lawsuit against Lucent, alleging that Lucent breached its obligations under a strategic partnership. The company claims the alleged contract breach forced it into bankruptcy. Lucent called the suit "absolutely frivolous."

Winstar says the bankruptcy filing will not affect day-to-day operations and the company has arranged for debtor-in-possession (DIP) financing of \$75 million, which could later be increased to \$300 million. The bankruptcy news comes two weeks after the troubled carrier announced plans to lay off 2,000 workers, or less than half of its employees.

BY MICHAEL MARTIN

ike last year's crop of contestants on the television show "Survivor," telecom slamming just won't fade away.

Slamming — the practice of switching a customer's phone service without permission — has been around for as long as competition in the telecommunications market. For years it had not been seen as a serious enough problem to warrant a major crackdown.

Late last year that changed when the Federal Communications Commission passed antislamming rules, which advocates hope will put an end to the practice.

While no hard-and-fast numbers exist on who gets slammed or how often, the consensus is that consumers and small businesses are the easiest marks. After all, large companies have telecom managers who deal exclusively with telecom serClosing the door on slammers

Here are some tips for preventing your telecommunications services from being switched to another provider:

- Contact your local exchange carrier and tell them not to allow changes without your written authorization.
- Train your branch-office personnel not to have discussions with anyone about the company's telecom services.
- Beware of third parties on a call. If you're discussing your telecom services and there is a third party on the call, chances are your service is being switched.

vices and billing and aren't likely to be

However, the branch offices of major corporations and remote workers don't have the same kind of expertise and are targeted by slammers.

Doug Hogue, telecommunications project manager for UniFirst, a uniform supplier in Wilmington, Mass., with more than 130 locations in the U.S. and Canada, says there are two tactics slammers use to try to switch the telecom services to UniFirst's branch offices.

The first is to tell the branch office that UniFirst's head office has authorized the slammer to switch the branch office's telecom service and request the branch office to merely confirm the change.

The second is to send out rebate checks that have a small-print clause authorizing a switch of telecommunications provider.

Hogue says the slamming isn't a major concern for UniFirst. If the branch office doesn't notice its telecom service has been switched, UniFirst has a telecom analyst who looks at the company's phone bills to spot anomalies.

When UniFirst notices a slamming, the company typically calls the provider that benefited from the slam to get a credit and have service switched back to the original provider.

"That's pretty much all we can do," Hogue says. "Going to the FCC takes too much time and money."

Bill Moore, telecommunications manager for The Museum of Modern Art in New York, says MOMA has one or two of its remote lines slammed every few

"It's nothing major," he says. "It's more on the annoyance level."

Like Hogue, Moore says the slams are easy to spot. Moore gets his phone bills on compact disk and can run reports on the calls. If he finds any that aren't billed by Verizon or AT&T, MOMA's

www.nwfusion.com

See **Slamming**, page 32

## Nextel touting better indoor service

RadioFrame to ease traffic on standard radio frequency.

BY DENISE PAPPALARDO

REDMOND, WASH. - Nextel Communications customers looking for better coverage when they're inside their office or at an airport will soon get relief, the company says.

Nextel is expected to announce this week that it will deploy RadioFrame

wireless systems inside buildings to offer customers improved indoor digital cellular coverage. The wireless service provider will first target high-rise buildings, campuses, airports and shopping malls that are densely populated with Nextel customers.

Wireless service providers, such as Nextel, are deploying indoor minicell sites to improve spectrum use and the quality of service within buildings. The latter is expected to increase usage.

"This product allows us to provide indoor coverage where it was not available in the past," says Eddie Edwards, director of base station and fiber technology at Nextel.

The RadioFrame gear will be able to move traffic off Nextel's standard radio frequency network and onto spectrum that it owns but is not suitable for use because of building interference.

Such gear overcomes building interference obstacles within an existing spectrum range in large office buildings, See Nextel, page 32

Read all about the FCC's new slamming liability rules and get a list of required documentation if you need to file a complaint.

#### Improving wireless service indoors

**Nextel plans to deploy RadioFrame** minicell sites within high-rise buildings. The new technology is expected to:

- · Increase the quality and reliability of cellular coverage within buildings.
- Remove traffic off of Nextel's national cellular network by keeping local traffic local
- Eventually support PBX features on wireless phones.

#### Carriers & ISPs

Slamming, continued from page 31

providers of choice, he knows there's something wrong.

Moore says getting compensation from slammers has never been a problem. But getting an explanation of how MOMA got slammed is another story.

"They always have an excuse, or say they don't know how it occurred," he

The biggest slamming culprits are usually third-party firms hired by the telecommunications providers to drum up business, says Tom Nolle,

president of telecom consultancy CIMI Corp., and a columnist for Network World. Because the companies get compensated for every new customer they sign up, there's plenty of incentive for them to use every trick in the book to get consumers and businesses to switch providers.

One way companies can prevent switching of their phone service is to get Primary Interexchange Carrier (PIC) freezes put on their lines. PIC freezes mean that service on lines can't be switched without written authorization.

However, Hogue notes it can be difficult to get PIC freezes for all company lines because the freezes must be ordered from the local voice provider, and a geographically diverse company, such as UniFirst, has hundreds of lines with many providers.

Also, a line with a PIC freeze on it can still be changed without written authorization if an independent thirdparty company is on a call where a change of service is approved, Nolle notes. The third-party companies are authorized by the FCC to approve changes on lines that have a PIC freeze on them.

"If you're on a call discussing your service and a third party is also online, you're probably having your service switched," Nolle says.

He says slams may be increasing slightly because competition in the telecom market is fiercer than ever.

But Marie Breslin, director of federal regulatory with Verizon, says federal

#### What to do if you're slammed

#### Among the recommended options:

- · Notify the slammer and tell them to switch your service back.
- Notify your incumbent carrier and tell them you want your service changed back.
- · Notify your local regulatory agency.
- Send an e-mail or written complaint to the FCC.

and state officials have been cracking down on slammers the past two years, decreasing the frequency of slams.

The latest legislation, passed in November, states that slamming victims do not have to pay any charges resulting from a slam for up to 30 days after they have been slammed. After 30 days, they must pay charges to their authorized phone company at the customer's standard rates.

If a customer has paid a bill, the slamming company must pay the customer's authorized provider 150% of what the customer paid to the slammer and must pay 50% of what was paid back to the customer.

"There are a lot of financial disincentives for slammers right now." Breslin says. "This should lead to less slamming. My personal hope is that slamming will become a complete nonissue within the next six to 12 months."

# Bandwidth?



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#### Nextel,

continued from page 31

shopping malls and airports.

RadioFrame uses a softwaredefined radio system that detects and registers wireless users within an indoor facility, so calls for those users are forwarded to the RadioFrame minicell site instead of a standard, outdoor cell site.

The system supports all wireless standards by adding RadioBlades, which are radio frequency interfaces, to the RadioFrame transceiver.

The vendor has a licensing deal with Motorola so it can mimic the same features and functionality of Nextel's proprietary Motorola-based Integrated Dispatch Enhanced Network digital cellular network.

The RadioFrame device also supports Bluetooth and 802.11 wireless LAN standards.

"A campus environment that has a high concentration of wireless users can cause capacity problems for the regular [radio frequency] network, so it makes sense to give these users a dedicated cell site," says Elliot Hamilton, senior vice president at Strategies Group, a consulting firm.

There are hot spots in metropolitan areas where spectrum use is high. Wireless service providers are looking to offer users reliable service, while getting the most out of the spectrum they already have, Hamilton says. Spectrum efficiency becomes more of a problem as users buy buckets of wireless minutes every month and want to use what they pay for.

Nextel will begin field trials in July or August.

The company also expects to offer new services using the technology.

Because the RadioFrame gear connects directly to an existing LAN or wireless LAN, Nextel expects it will be able to link wireless users to their corporate PBX systems.

This will let wireless customers use the same functions, such as four-digit dialing, call forwarding and conferencing, as if they were using their desktop phone. Nextel did not say when such services would be available.

Nextel: www.nextel.com





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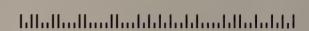
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Service provider developments at the juncture between the enterprise

## Briefs

Lucent says it will supply digital wireless systems, engineering and installation services for the existing U.S. Cellular network in Virginia, West Virginia, North Carolina and South Carolina.

Under the agreement, Lucent has begun installing a digital network based on Code Division Multiple Access (CDMA) technology.

The four-year contract is worth up to \$100 million.

Lucent: www.lucent.com

Start-up Pirus Networks announced one of the first carrierclass IP storage switches for transporting block-level data over Gigabit Ethernet networks.

The Pirus Storage Utility Switch supports the iSCSI specification, which lets native SCSI data travel over IP networks, as well as filetype data such as Unix' Network File System and Microsoft's Common Internet File System. The chassis-mounted Storage Utility Switch has 32 10/100M-bit/sec Ethernet ports; eight 1000Mbit/sec Ethernet ports; and four Fibre Channel ports in each module. It will ship in the fourth quarter. Pricing is not available.

Pirus Networks: www.pirus. com

Start-up WaveSmith Networks last week announced an agreement with AP Engines to integrate WaveSmith's upcoming multiservice switch with AP Engines' billing mediation software for telephony and broadband providers.

This integration will let service providers support WaveSmith switch usage data in their Operations Support Systems applications if those applications are based on AP Engines' Billing Mediation Platform software. This data can be used to bill customers back for network usage.

WaveSmith: www.wavesmith networks.com; AP Engines: www. apengines.com

## A big fish in the optical PON

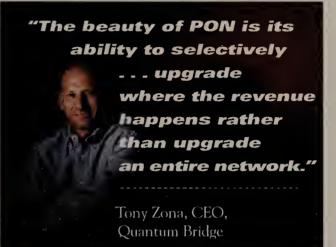


While most ven-NetworkWorld dors are keeping a low profile during the current market malaise, Quantum

Bridge remains upbeat on the industry and its business in passive optical networks (PON). Quantum Bridge CEO Tony Zona shares his thoughts with Network World Staff Writer Terri Gimpelson.

What are the pros and cons of PONs, and why has Quantum Bridge chosen that path?

If you look at access networks that are fiber-based, many of them have SONET in the middle of the access plants. SONET's add-drop multiplexers are expensive from an electronics standpoint because you have to find a place to put them, you have



to lay the concrete, and that takes time to harden. From a maintenance perspective, every time there's an advance in technology or end users require more bandwidth, you have to go through new hardware and change out electronics.

PONs don't care what kind of protocol is running over them, so not only does it leverage an embedded base of fiber, it's a great technology that offers multiple levels of bandwidth and you don't have to worry about truck rolls, forklifts and upgrades.

Some analysts say PONs are only cost-effective if users don't require additional bandwidth. One said if bandwidth in a PON is exceeded, then PONs become less cost-effective because you

have to start laying more fiber and deploying additional electronics. Is that true?

That is absolutely not true. Burstable technology tends to have an upper limit depending on where the industry is in See Quantum Bridge, page 36

### Dorado Software manages multivendor networks

Redcell software can enable customer-provisioned services from a variety of routing, switching devices.

BY TIM GREENE

FOLSOM, CALIF. - Dorado Software wants companies to be able to provision their own bandwidth and network services using the company's Redcell management and provisioning software.

Later this year, Dorado will unveil a version of Redcell for enterprise networks. Meanwhile, Redcell is already monitoring and managing devices, and provisioning services in service provider networks.

The software makes it easier for service providers to manage the services they offer to customers, even when equipment made by multiple vendors make up their networks, Dorado officials say. An enterprise version will enable service providers to let their customers change the services they buy on the fly.

"If a large grocery store chain needed 256K bit/sec extra bandwidth for a videoconference for training, we see that as a potential capability," says Rick Barry, vice president of information services for IP Communications, a broadband service provider in Dallas and a Redcell user.

This self-provisioning also eliminates the need for a customer to contact a service representative, a step where mistakes can be made.

Redcell has four components: Provisioner, which sets up templates for services such as virtual LANs (VLAN); Assure, which monitors and reports on the network; ConfigBuilder, which manages configuration of distributed devices to set up services for individual customers; and MetaPolicy, which stores network policies, information on users, access data, applications, directories and network resources.

For instance, the software can set up a VLAN network for a customer, then impose quality-of-service levels on top of that. So a provider could offer multiple service qualities on its VLAN service and sell them for different prices.

Dorado has no direct competitors for the range of capabilities it offers, says Glenn O'Donnell, project director for Meta Group. But other vendors such as BMC Software, RiverSoft and individual hardware vendors which write software for their own platforms compete against some features of Dorado's offerings, he says.

Orchestream also develops "service acceleration" software that supports Cisco, Juniper Networks and Avici routers.

Dorado boasts Adtran, Cisco, Foundry Networks, Juniper, Lucent, Riverstone and World Wide Packets among about 30 companies with hardware that can be managed using Dorado's Redcell software. If a service provider needs to configure devices from other manufacturers, Dorado can write software to do so on a custom basis, the company says.

The company started out selling its software to hardware vendors that wanted to sell its equipment to service providers that specialize in wireline, high-bandwidth local access.

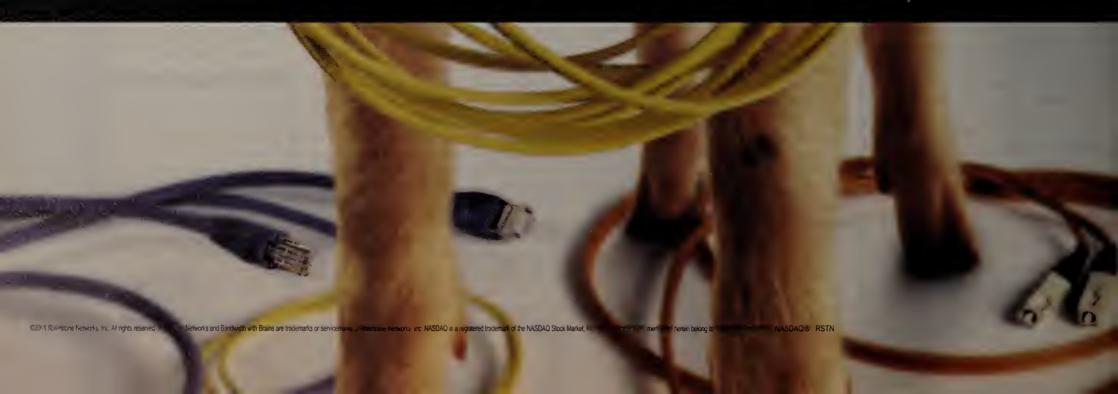
This year, the company plans to expand further to include wireless and cable providers, according to O'Donnell.

Dorado: www.doradosoftware.com





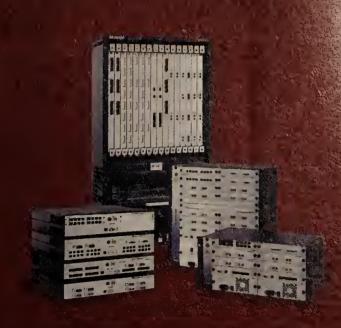
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Bandwidth with Brains

#### Quantum Bridge, continued from page 33

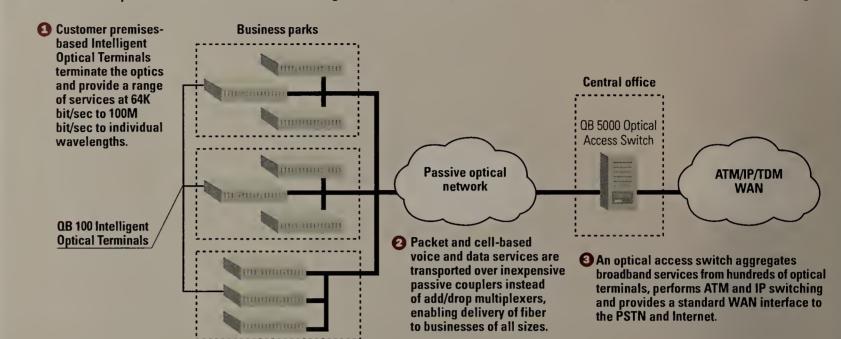
developing that technology. The beauty of it, though, is that you can overlay multiple wavelengths on top of that. So it's a technology that can offer fractional wavelength services to an end user in megabits of service. It's when a customer gets into the 155M to 200M bit/sec range that it may make sense to give that customer their own wavelength. The beauty of PON is its ability to selectively, on a customer as-needed basis, upgrade where the revenue happens rather than upgrade an entire network.

#### What are the scenarios in which PONs wouldn't be appro-

PON is really targeted at clusters of small- and midsize businesses. It really works best for those who have that embedded base of fiber that they may want to leverage. If a carrier doesn't have a fiber base, they might decide that point-to-point or ring-based networks might be better. Depending on who the customer is, if they don't have embedded fiber, or if fiber is a scarce resource, or even if you're going to do a complete overbuild, PON may not be the answer. It depends on who the customer is and whether they

#### Passive optical networking (PON):

PON lets service providers offer business users a range of bandwidth services from 64K bit/sec to 100M bit/sec to dedicated wavelengths.



want diversely routed technology, like a ring technology.

#### Have you changed your marketing strategy or your product development in response to what the market's doing now? Are you targeting a different customer base?

No, we've had the vision from the beginning to go after facilities-based service providers. Two years ago, when we got started, there was a lot of industry mind-set around, 'Let's

go after competitive local exchange carriers (CLEC), the ones who are not facilitiesbased.' But they were the ones who we saw moving. We targeted facilities-based specifically because of the size and scope of their operation. And when they roll out service, they tend to do it nationwide or regionwide, and they also tend to involve outside plant construction, but it tends to take them a while to make that decision. They're not the first ones to move, but they're the ones who are best capitalized and they're the ones who have real assets. They were the ones who we felt were going to be leaders in access networking, so that's who we focused on and it's worked tremendously well. We have customers now, the same customers from a few years ago that haven't evaporated like CLECs.

#### What are the differences between Ethernet PON (EPON) and ATM PON (APON) and which do you prefer?

Our view is that it's not about protocol. It's about services and supporting businesses. An interesting story is when we first started Quantum Bridge, our first PON was EPON. We invented the technology and have a patent on the technology, but one of the things that drives this company is that we don't develop anything unless there's a customer sitting at the table, weighing in on a development decision. All the customers that were sitting around the table for Quantum Bridge said, 'I need to serve multiple protocols and if you build an EPON, that's nice, but that doesn't do it all. I need to serve voice (and) cells. I need to serve Internet.' So we support EPON, APON, direct Internet connection, direct ATM connection or direct [time-division multiplexer] connection. We need to do it all in order to adequately serve our customers.

It's just to put a stake in the

market. Our view is we're a member of the Ethernet in the First Mile standards body and we're looking into the EPON standard. Maybe it will become the first PON protocol, and maybe it won't, who knows. Our view is that it will be an important standard, but it'll only be important to the extent that customers adopt it and build networks based on it.

#### I'm a customer and I come to you and say, 'PON, EPON, APON?' What are you going to tell me?

If you're an end user, I'll tell you that you don't care. What you do care about are what services you're getting and what your carrier charges you.

#### And if I'm a corporation?

I don't think it matters there either. What matters: Are you delivering [quality of service], does it match with my application profile and how much are you charging me for it? That's what you really care about.

#### What, then, is Quantum Bridge more or less supportive of?

We've got PON, anything-PON. That's the 'A' that we use. It's a great technology because it's a part, an important piece of, an overall optical access strategy. There are places for EPON and APON. Today, the carriers with money to spend are buying APON. Look at the [incumbent local exchange carriers], look at the [multiple system operators]. The ones who are well capitalized, the ones who aren't burdened with tremendous debt are buying ATM.

# **NetScaler** aims to help hosting nets

New switches designed to help increase service providers' capacity.

BY PHIL HOCHMUTH

NetScaler this week will announce two new Web switches designed to speed up Web traffic for large content delivery

The NetScaler 3100 and 3200 content switches are targeted at hosted application and content service providers. The switches inspect packets from incoming traffic flows at the transport layer — Laver 4 — for redirecting traffic to the most available scrver.

The switches are also designed to look at the application layer, or Layer 7, of a packet, which routes traffic to the appropriate application or Web server more quickly.

The NetScaler 3100 provides redundant 10/100M

bit/sec ports while the 3200 model moves traffic at 1G bit/sec. Both boxes can support up to one million simultaneous client/server connections, NetScaler officials say.

Through load balancing and cache redirection, NetScaler switches also can avoid traffic slowdowns that may occur when only Web caching devices are used, says Rakesh Singh, director of product marketing

"Once a cache runs into dynamic content or interactive content . . . it becomes inefficient in terms of making a decision as to what to serve vs. what to redirect," Singh says.

The NetScaler switches can sit between a cache and an ingress router to determine if it should direct the request to a

cache or original server.

NetScaler's products compete with Cisco, Nortel Networks, Foundry Networks and Top Layer Networks in the Layer 4 to Layer 7 switch market for service providers. Research firm IDC predicts the worldwide Web switching market will jump from \$203 million in 1999 to more than \$4 billion by 2004.

The NetScaler 3100 and 3200 are available and cost \$20,000 and \$25,000 respectively.

NetScalcr: www.netscaler.



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# Enterprise Applications



Intranets, Messaging/Groupware, E-commerce, Security, VPNs, Network Management, Directories

# Briefs

Intel last week said it opened seven new e-business testing facilities to help end-user companies build e-business operations. The centers are in California, Virginia, Sweden, England, Germany, India and China. This brings to 16 the number of test centers Intel has opened under its Intel Solution Services program since it began in the first quarter of 2000. Intel said the opening of the new centers is in response to the changing e-business environment in which companies have a much greater focus on getting a financial return on their investment. Using the centers helps end users minimize disruption to their dayto-day operations while building e-business applications.

Existing services include analyzing end users' hardware and software requirements, and optimizing and stress-testing their e-business applications. Intel is also making new services available under the program, including tuning, infrastructure services, server stack integration, migration, network design and management, and architectural design.

Intel: www.intel.com

**BMC Software** last week announced its Patrol for Broad-Vision performance and availability software. The product manages e-business applications and their connectivity to database and Web servers. It also monitors user sessions, letting net managers see potential problems before they affect end-user transaction speeds, network response time and Web site performance. BMC says Patrol for BroadVision automates problem detection by monitoring log files, which eliminates the need for BroadVision administrators to manually browse the log files to find error messages. Patrol for BroadVision is available now, and pricing starts at \$2,495.

BMC: www.bmc.com

# **Exodus bolsters managed services**

Company teams with Amdahl to offer system maintenance help.

BY JENNIFER MEARS

SANTA CLARA — Exodus is expanding its managed services offerings with on-site multivendor hardware and operating system support that it will deliver in partnership with Amdahl. The Premium Care Service, unveiled last week and available immediately in Exodus' North American data centers, provides a 30-minute response time to problems and a guarantee that service is restored within four hours of trouble.

The service eliminates the need for enterprise customers to contract with multiple maintenance organizations, says Chris Richter, director of product marketing at Exodus. Richter says at times Exodus engineers are unauthorized to fix specific hardware problems and companies have to bring in manufacturer-authorized technical personnel. The Premium Care Service

eliminates that hassle, he says.

"Exodus customers will now have a hardware maintenance service that is provided by a single source, as opposed to having to buy the maintenance service from many different sources covering all the different equipment in their cages," he says. "We just found it would be a lot easier if the customer had one point of contact, one phone number and one contract."

The Premium Care Service draws on Amdahl's 30 years of expertise in providing infrastructure services and products. Late last year, the Tokyo Fujitsu subsidiary

#### Quick fix

Exodus and Amdahl are teaming up to provide field engineering services in Exodus data centers. The Premium Care Service includes:

- 30-minute response time to problems.
- · Four-hour return to service.
- Single-point access to multivendor problem diagnosis and repair.
- On-site spare hardware.

pulled out of the mainframe business to focus on managed services and last month unveiled InfraCare, its round-theclock managed IT infrastructure support.

Amdahl uses the resources of Fujitsu and other Fujitsu subsidiaries to offer the global service, says Larry Fillmer, president of Amdahl IT Services. He says Amdahl can service the majority of best-of-breed vendors, such as Sun, Compaq and Intel-based servers.

Customers who subscribe to the Premium Care Service will have a single point of contact for multivendor diagnosis and repair by telephone or through the Web. The myExodus Web portal will give users access to inventory data, service history and trouble-ticket status.

In addition, customers will have access to on-site certified engineers, dedicated service delivery managers, on-site spare hardware and formal escalation procedures.

Richter says customers contract for the Premium Care Service as they would for any of Exodus' managed services and receive a service-level agreement with Exodus. Richter would not divulge specific costs but says the price will vary depending on the equipment covered.

The Premium Care Service is expected to be available in Exodus data centers in Europe by late summer and in Asian-Pacific data centers by the fall, Richter says.

Exodus: www.exodus.com; Amdahl: www.amdahl.com

## Aprisma set to manage applications

BY PHIL HOCHMUTH

ROCHESTER, N.H. — Aprisma this week will announce a software module for its Spectrum network management platform it says will let network professionals control and monitor enterprise applications.

The company's Spectrum Application Manager is intended to alert users if backend databases such as Oracle go down, or if server applications such as Apache Web server or server operating systems themselves are having problems. The company says Application Manager will integrate into the Spectrum net management package, letting users monitor and control all the hardware and software elements in their networks from a single console.

Application Manager is based on technology from Dirig Software. In addition to integrating the Dirig code into the Spectrum platform, Aprisma will resell Dirig's application management tool as a standalone product.

Spectrum lets users manage the elements in an enterprise network by providing an overall topology view of SNMPmanageable devices, such as routers, hubs and switches. The software also lets users remotely configure data communications equipment on their networks and create alert settings for network elements.

Application Manager is based on software agents that are installed on network servers. The agents collect data on a server's health and the status of applications running on a server and report back to a central Spectrum console. Spectrum can be used to configure and restart services and applications from servers anywhere in an enterprise from one console. The software agents can support applications running on Microsoft Windows NT and 2000, Sun Solaris, Linux, HP-UX, Free BSD and IBM's AIX.

Spectrum is used to manage the network at Aurora Health Care, a healthcare provider with over 100 sites in eastern Wisconsin. Kim Kloskey, WAN network engineer for the firm, says she plans to integrate Application Manager into her network, which has more than 250 servers that support a central healthcare management application, as well as standard office productivity software. Kloskey says she likes the idea of bringing applications on her network into the Spectrum fold.

"We're hoping that [Application Man-See **Aprisma**, page 40



# Microsoft set to roll Windows management package

Microsoft operations manager will help monitor file and print services, Active Directory and more.

BY JOHN FONTANA

Microsoft next month will begin laying the groundwork for an open and extensible management platform system it hopes to build around its servers and applications.

The platform is Microsoft's first serious attempt to offer IT executives a management suite for Windows operating systems and applications.

While Microsoft acknowledges it is only a first step to building an object-oriented management environment, critics say there are a lot more steps to come before the platform becomes reality. And there needs to be a lot more explaining about how the environment will be built and how it will plug into other management platforms, they say.

The first step comes next month, when Microsoft will unveil the first release - the final beta test before general

availability - of its Microsoft Operations Manager (MOM), which is designed to monitor servers. The next step will be the release of the new version, code-named Topaz, of its desktop management software System Management Server. The beta is scheduled for this fall.

MOM is an event and performance monitoring tool licensed from NetIQ. It will be used to monitor systems such as file/print, Internet Information Server and Active Directory. Microsoft will develop some 20 modules and offer a tool kit for developers.

But the first version, to be released late this summer, is not much more than a rebranding of the NetIQ product --- Operations Manager.

But it represents the first plug-in to a management platform Microsoft is creating to support .Net, which includes a set of interconnected servers for online software delivery. The

#### Mother hen

Microsoft next month will ship the first release - the final beta test before general availability - for Microsoft Operations Manager (MOM). Here's a look at some of the event and performance monitoring features:

- Monitoring of multiple event sources, such as event logs, WMI events, SNMP traps, syslog and transaction logs.
- · Scriptable responses for realtime automation and recovery.
- Rules-based analysis and filtering.
- Customizable database query and reporting.
- Automatic notification and customizable corrective actions.

platform will include features built into the operating system and plug-ins such as MOM.

"MOM's primary goal is management of server components and mission-critical workstations," says Michael Emanuel, senior product manager for management technology at Microsoft. "The goal is for it to be part of a larger management system." Emanual says Microsoft will create a "managed Windows" that can be plugged into a larger enterprise management system.

Critics say it is a tall order.

"They have to expose APIs and break the product into components that can be plugged into other environments. That is the hard part," says Cory Ferengul, an analyst with Meta Group. "They need to get the components right to make use of the system's various parts and data."

Ferengul says MOM is part of an "incredibly ambitious attempt to build an objectoriented management environment." He questions whether Microsoft can embed in the

operating system something similar to what Computer Associates and Tivoli have been trying to do for a decade. The other question is whether Microsoft plans to compete with those

Emanuel says the company will take a co-existence view. But he added that there is no reason why a mainframe cannot be managed from a Windows management platform.

"That is where there is work to be done by an ISV. We are trying to create an open platform that you can manage from Windows or plug into a larger management package," he says.

#### continued from page 39

ager] will allow us to do a lot more end-to-end management of our network," she says. Application Manager can also supply users with detailed logs of application faults throughout the network. This could be useful to enterprises and network management service providers for providing reports on a network's performance.

Application Manager follows the recent addition of Spectrum Security Manager (SSM), which was released in January. SSM is a stand-alone software product that when used with the Spectrum management platform, correlates security alarms and alerts with network performance data.

Aprisma is shipping Dirig's Application Manager software immediately and will start shipping the integrated Spectrum/Dirig product June 1. For customers already using Spectrum, adding Application Manager will cost \$30,000, plus \$500 to \$900 per server agent, depending on the number of agents ordered.

Aprisma: www.aprisma.com



# Auto industry network gets message-brokering service

BY ELLEN MESSMER

DETROIT - SAIC, the company that manages the private ANX Network used by 850 manufacturers in the auto industry, this week announced it has added a business-to-business message-brokering service to its list of certified ANX services, which until now have been limited to approved VPN and ISP offerings.

SAIC has selected Peregrine Systems (which last year purchased Harbinger Corp. for its electronic data interchange services and software) as the provider of the new Internetbased, business-to-business message-brokering service called ANXVelocity for the auto industry. While SAIC says use of the Peregrine messagebrokering service won't be mandatory for auto suppliers sharing EDI business data with the Big Three automakers, ANXVelocity should be cheaper than a traditional EDI value-added network.



Alex Preston, president and CEO of SAIC's ANX eBusiness unit, says Peregrine's message-brokering service could save ANX 30% over using EDI VANs.

"We were interested in the Peregrine services for message brokering because we think it's going to bring a 30% price reduction instead of using EDI VANs," says Alex Preston, president and CEO of SAIC's ANX eBusiness unit.

SAIC has owned the private ANX network since late 1999, when it purchased it from the

Automotive Industry Action Group.AIAG is the Detroit-based trade group that Ford, General Motors and DaimlerChrysler turn to as the forum for setting technical guidelines with auto suppliers. AIAG started the ANX four years ago for secure IPbased communications.

SAIC continued the auto industry's practice of certifying VPN and ISP services allowed on the private ANX, and this week marks the first time SAIC has certified a hosted Web application for message brokering. SAIC has no immediate plans to add similar competing services.

Message brokering involves translating between various EDI formats, and this needs to be done in the auto industry between the Big Three and their suppliers, where EDI is used to share business data about production schedules and fulfillment.

Though the suppliers typically sell parts to GM, Ford and DaimlerChrysler, each of the Big Three has separate

demands about the kind of EDI they want suppliers to use, Preston says.

"GM uses EDIFACT, Ford uses X12, and Chrysler has started moving from EDI to an XML-based standard," Preston savs.

EDI format conversion has long been done by the proprietary EDI VAN, including the older Harbinger VAN that Peregrine maintains even as it encourages customers to migrate to the newer IP-based GetToConnect hosted service for business-to-business supply-chain messaging. But pricing has usually been levied on a kilobyte basis.

Peregrine's IP-based ANX-Velocity will be based on monthly subscription fees, which Preston declined to disclose."

Peregrine will host the ANXVelocity application at its data facility in Atlanta, and SAIC and Peregrine will jointly market the service to ANX members.

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## Online Yellow Pages for business set for launch

BY ASHLEE VANCE

SAN FRANCISCO - A Web-based directory for businesses that has

earned the blessing of industry heavyweights is set to launch by next month, opening new ways for businesses to find partners and complete transactions together online.

The Universal Description, Discovery and Integration (UDDI) registry promises to make it easier for businesses to

provide information about their products and services on the Web, as well as locate partners and customers. A number of registries that use differing protocols exist on the Web already, but Microsoft, IBM and Ariba said they want to promote a common, shared set of identifiers. Companies can submit information about their businesses to the registry free of charge, the vendors say.

Microsoft, Ariba and IBM announced the Business Registry last September and billed the project as the first true Yellow Pages for the Web. The trio of vendors put out a beta-test version of UDDI in November and expect a completed version of the directory next month, a Microsoft spokesman says.

While Microsoft, Ariba and IBM have led UDDI's development, many of the business world's biggest names have joined the project, which they claim could ease the way in which companies conduct business online. American Express, Compag, SAP AG, Dell and Sun signed up to help out with UDDI at its launch. Since that time, the number of companies backing UDDI has grown to 130, with vendors including Hewlett-Packard and Intel eventually joining after some initial hesitation.

The UDDI system will contain three types of information, divided into what the vendors refer to as White, Yellow and Green Pages.

The White Pages will contain business names, descriptions of the type of business, and other information regarding what kinds of services a vendor uses and what protocols it supports. The Yellow Pages adopts current government codes for tagging types of business operations as well as international and technologybased naming protocols. In addition, it arranges companies by geographical location. The Green Pages should provide more specific information on what types of documents a company can receive, the entry points for transactions and the technology they currently interact with and support.

Many of the companies involved in the project hope to build more specific directories on top of UDDI as the project moves along. They hope to have UDDI as an open, common starting point with consistent identifiers for companies' business practices. With that base, vendors can offer other services on top of the directory, which could let them generate additional revenue.

Microsoft, IBM and Ariba will maintain the servers that collect the registry information for about the next year, at which time the project will be turned over to an as-yet unnamed standards body. Updates to the registry are scheduled to appear throughout the year, with more complex features to be added for varying types of business-tobusiness transactions.

Vance is with the IDG News Service's San Francisco Bureau.

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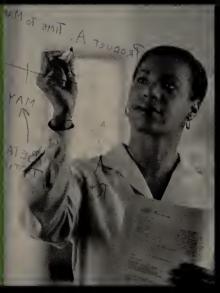
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**Publication** 





Explore the Whole World of Communications

GEORGIA J U N E ATLANTA

#### Enterprise Applications

'Net Insider . Scott Bradner

#### 'A PRIVACY KIND OF GUY'

t looked real bad for privacy lovers. The same Republicans who had been saying good (or at least semigood) things about protecting our pri-

vacy, started to sing another tune once they got in power.

First, Department of Health and Human Services Secretary Tommy Thompson was strongly hinting that the active date for the medical-privacy rules that had been too long in coming would be delayed indefinitely.

Then, Republican House Majority Leader Dick Armey sent a memo to his House colleagues with the clear message to anyone who might be thinking of proposing pro-privacy legislation to back off. The letter, while ostensibly saying that the U.S. government needed to get its house in order before telling others to do good things, was too full of ridicule to be taken for anything but an antiprivacy manifesto.

We privacy advocates were starting to view the new Bush administration the same way that many environmentalists were, but without the occasional mitigating action.

Still, there is reason for some hope. President Bush "directed" (in the language of the White House announcement) Thompson to let the federal medical-privacy rule become effective on schedule.

The rules do not have to be complied with for two years, so there is plenty of time for your HMO to make a buck selling your medical history to your prospective employer.

In addition, the President created some concern when he asked Thompson "to recommend appropriate modifications to the rule" to address "legitimate concerns" that have been raised about the rule. The only concern President Bush mentioned was allowing parents access to their children's medical records, but the medical industry is busily loading trucks to drive through this loophole.

But other things have happened of late that hopefully will mean such trucks will be somewhat limited in scope.

In what was probably not a total coincidence, the *Wall Street Journal* published an extensive article showing that Bush is a privacy advocate. The article quoted officials saying Bush will "tend to side with the privacy point of view" and that the President described himself as "a privacy kind of guy" when he made the decision to let the federal medical-privacy rule stand.

The article also quoted an interview Mr. Bush gave shortly before becoming president in which he said he would protect medical records and "make it a criminal offense to sell a person's Social Security number without his or her express consent." Good stuff!

The proof will be a while in coming. Will the President help Armey see the light or will the medical industry win out? This is but a little skirmish in a long battle to give people power over information about themselves. The battle will go on for years to come.

Disclaimer: Harvard has a new president coming on board soon, but I have no idea what his opinion or the opinion of the university is on the above topic.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

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# lechnology

An Inside Look at the Technologies and Standards Shaping Your Network

#### Ask Dr. Intranet



By Steve Blass

Do you know of any books that will help us build an intranet with Windows 2000 Server? All I can find are books on

building intranets with NT 4.0.

The Win 2000 Microsoft Certified Systems Engineer (MCSE) Training Kit books from Microsoft Press can help translate NT 4.0 guidelines into the Win 2000 environment. The Guide for MCSE Exam 70-222, "Upgrading to Microsoft Windows 2000," walks you through the initial upgrade and describes DNS, Active Directory, **Dynamic Host Configuration** Protocol and Group Policy implementation. The guide for Exam 70-125, "Microsoft Windows 2000 Server," provides additional details and includes a chapter on Windows 2000 application servers. It also devotes more than 50 pages to administering a Web environment under Win 2000. The guide for Exam 70-126, "Windows 2000 Network Infrastructure Administration," includes lots of information on TCP/IP networking and security configuration under Win 2000. I'd also recommend the guide for Exam 70-127, "Windows 2000 Active Directory Services," to help make the most of integration between the operating system and Active Directory resource controls. Other Microsoft resources include the Internet Information Server and/or Site Server documentation, depending on which server you're deploying, and tech support resources online.

Blass, a network architect at Change@Work in Houston, can be reached at dr. intranet@changeatwork.com.

# Edge routers for IPv6 migration

BY DAVID PRESTON

rganizations today are too dependent on the Internet to experience any downtime when upgrading from IPv4 to IPv6.

But help is on the way.

The Internet Engineering Task Force (IETF) has defined several technologies that, when combined, can make the transition from IPv4 to IPv6 virtually seamless, while adding value and extending the capabilities of edge

An edge router connects the "last feet" between a device and its connection to the Internet. It is the box that takes your Internet connection and makes it available to your systems connected on a LAN.

Many of today's edge routers include network address translation (NAT), which lets users conserve IP addresses. NAT substitutes a LAN system's TCP/IP address with that of the NAT router, making it appear as though there is only one system connected.

#### Trouble zone

Despite saving space, however, NAT isn't trouble-free. With NAT, external users "see" your entire subnet as one computer, and this causes inherent problems.

For example, it makes it impractical to host multiple Web servers, each of which needs its own IP address. Multimedia and interactive Internet activities are also hard, sometimes impossible, to set up through a NAT router. And you can't nest NAT devices to create multiple subnetworks.

NAT, as generally deployed today, also limits the extensibility of VPNs; limits encryption and security; and, most importantly, does not play nicely at all in IPv6-based networks.

Since there is a massive installed base of IPv4-based hardware and software, the transition to IPv6 will only be possible if it is made simple. The IETF has published a series of documents that define a transitional edge router.

These specifications are:

• DNS-ALG (Domain Name System extensions to network address translators, RFC 2694) defines DNS extensions to NAT and outlines how DNS can alter address mapping of hosts as DNS packets cross from one address realm into

- SIIT (Stateless IP/ICMP Translation Algorithm, RFC 2765) defines a way to translate between IPv4 and IPv6 packet headers that lets IPv6 hosts communicate over an IPv4-based router network.
- NAT-PT (NAT-Protocol Translation, RFC 2766) defines a methodology for converting private IPv4 packets into public IPv6 packets.
- 6to4 (Connection of IPv6 Domains via IPv4 Clouds, RFC 3056) defines a

can eliminate many of today's networking headaches.

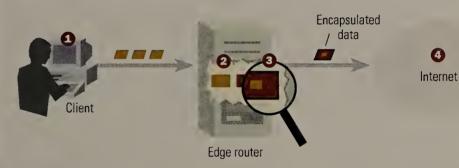
#### **Benefits**

For example, administrators can choose to hide or expose network elements such as Web servers and databases to general Internet users, regardless of their physical location. IP addresses can be duplicated on separate subnetworks, alleviating the need to manage IP addresses in a VPN. Users

#### HOW IT WORKS

#### IPv4 to IPv6 migration

Edge routers can encapsulate IPv4 packets inside IPv6 packets and pass them on to an IPv6 backbone.



Client sends IPv4 packets to router.

2 Router examines data packet and determines whether it is IPv4 or IPv6.

3 If backbone is IPv6, router encapsulates the IPv4 packet in an IPv6 packet.

Router sends encapsulated packet across the Internet.

methodology for encapsulating IPv6 packets for seamless transition over IPv4 backbones.

#### **Building transitions**

When you combine these documents with a little architectural glue, you get an environment that lets existing v4 systems communicate on a v6 backbone. An edge router with this complement of software would provide a very reasonable transition for exiting v4 clients.

If you add v4 IP Security (for VPN tunnels); a configurable, per-protocol firewall; an IPv6 router; autoconfiguration; multimedia services; and a Webbased interface to manage it all, you'll get an edge router that eliminates the shortcomings of today's NAT, plus a seamless way to migrate to the upcoming IPv6 Internet backbone. And you can have simultaneous access to the Internet and private VPN resources automatically.

Service providers can deliver accesspoint devices that provide scalable services to home users. They can also configure devices and services remotely from the head end, without rolling trucks.

End users would have seamless multimedia communications, and when the Internet transitions to IPv6, there would be no change required to the devices behind the edge router.

Finally, as IPv6 deploys to end nodes, no changes would be required at the edge routers.

Preston is vice president and general manager of InterNetShare in Sunnyvale, Calif. He can be reached at davidpreston@internetsbare.com.

#### Technology Update

Gearhead . inside the network machine . Mark Gibbs

#### WORKING WITH WIRELESS

ast week we got the PC side of the LinkSys wireless system running. This week, we get the wireless access point up and running. Like the wireless PC card, the LinkSys WAP11 wireless access point is easy to install. The WAP connects to your wired network and integrates the wireless

machines into the existing network.

When powered up the WAP defaults to an IP address of 192.168.1.250, and using the supplied Access Point SNMP Manager, you can reconfigure for whatever IP address you require.

Unless your network is configured for the 192.168.1.x address range, you'll find it much easier to use LinkSys' DFU utility that communicates with the WAP via a Universal Serial Bus connection.

Setup of the WAP is similar to configuring the wireless PC cards: The key issues are the Extended Service Set ID (the name of the network you want to connect to) and the WAP key pass phrase (see last week).

The other parameter is the IP address it must be assigned. The address is unusual, as once the WAP is running, the IP address you give it isn't visible on your network (that is, you can't ping it), although the SNMP-based configuration utility requires it to find the WAP.

A wireless net constructed from these subsystems is very interesting. It supports multiple WAPs so that PCs can roam, it ensures a reasonable level of privacy, and the communications seem reasonably reliable. I say reasonably reliable because there are many things that will attenuate 802.11b transmissions. Distance is obviously a factor, and LinkSys claims the maximum distance for operation at 1M bit/sec is around 1,500 feet outdoors and 300 feet indoors.

One of Gearhead's most fervent wishes was that this technology would work well enough that Mrs. Gearhead's office could be reached from Gearhead Central so we wouldn't have to struggle with wiring. Given the distance between the buildings is around 300 feet, it should have been no problem.

Alas, as always in networking, things weren't that simple. Maison Gearhead was built in the 1920s and the construction is, by today's standards, remarkable. The key issue, we suspect, is that the plastering is laid up on a metal mesh. The effect of the mesh is to create what we believe is called a Faraday Cage — essentially a grounded metal box. This construction more or less shields the inside of each room from radio waves and ensures that any signals generated inside the cage get attenuated to very low levels.

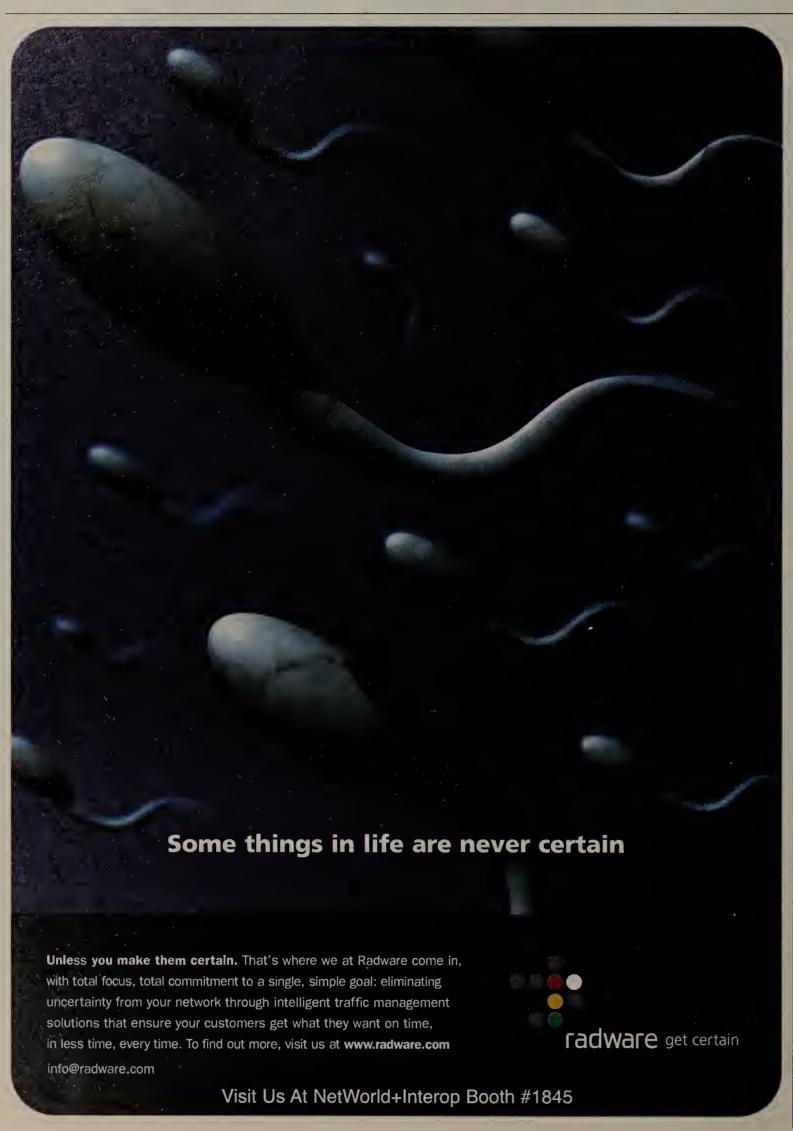
In our case (two shielded walls and 300 feet of air in the way), the signal just reached Mrs. Gearhead's office but at the very limit of reliability. We had a similar problem when trying to use a Siemens Gigaset 2.5-GHz wireless telephone system — the walls are a major problem.

The point I'm trying to make is that before you plan to deploy a wireless network, make sure your building structure will let you do so.

We wound up doing strange things with cables, punch-down blocks and patch panels to get Mrs. Gearhead connected, but we may still put a WAP in her office so we can connect from our laptop.

Next week, wild working with wireless while we weigh words of wonder.

Alliterative amusements to gear bead@gibbs.com.





# Management

Career Development, Project Management, Business Justification Strategies

# Pay attention to retention

Now's not the time to relax. The fact is, keeping your top IT talent is even more challenging when the economy goes south.

BY LISA KOSAN

hen AT&T outsourced some application development and data center management to IBM late last year, the telecommunications giant cut nearly 500 people from its IT staff. Attention then quickly focused on the survivors.

Employees who escape a layoff don't sit around very long wondering if their jobs are safe, especially at a company that, like AT&T, has just embarked on a massive corporatewide restructuring. They start looking.

So AT&T started listening. "We asked our people what concerns them, what bothers them, what can we do to make them more comfortable and secure about their work," says Pete D'Amato, vice president of network and local services for AT&T in Middletown, N.J.

What they heard was that the 1,500 remaining IT employees wanted assurances about the future of their organization at AT&T. They wanted specifics about training, overtime policies and promotion guidelines. And they wanted more face time with

D'Amato and other IT executives agreed to visit more sites. AT&T expanded its recognition program, upgraded its Web site and increased the amount of training employees are encouraged to take. "None of this was terribly innovative," D'Amato admits, but the moves helped convince employees of their value. "If we can get people happier now, they'll be less likely to leave when the market picks up," he says.

AT&T hasn't run a formal analysis of return on investment, but D'Amato is confident that focusing on retention has a big payoff. There's a low attrition rate,





or watch them go." While IT workers who perform critical tasks are less likely to become casualties of a sputtering economy, Kaye says they fret about job security when they see co-workers ushered to the door. And if the saggy market shifts the company's IT projects into strictly maintenance mode, just watch the resignations pour in.

How do you find money for training or raises when budgets are already squeezed? Be creative, says Kaye, co-author of Love 'Em or Lose 'Em: Getting Good People to Stay. You might offer flexible work schedules or a chance to work on different projects.

If your concern for employees is as cyclical as the economy, you will damage your organization's ability to recruit, retain and create a positive image in the market, says Diane Tunick Morello, a vice president with Gartner Group."You become as fickle as the economy," she says.

John Madigan, director of human resources for IT at The Hartford Financial Services Group of Hartford, Conn., says retention "is not just something you do when you're scared and the economy is good and they might go. You build it over time."

It helps that the best retention strategies are pretty cheap. "Some of it means we buy bagels and doughnuts once a month," Madigan says. "We're not spending lots of money on whiz-bang systems."

For example, new hires in the insurer's Enterprise Technology Services organization participate in an assimilation program. They meet with senior executives, have follow-up sessions after one, two and three months at work, and learn what everyone else does on the job.

Turnover within that organization is the lowest for all IT divisions at The Hartford: roughly 4%, compared with between 8% and 11% elsewhere at the company.

Gartner's Morello agrees that paying attention to retention doesn't always mean paying bigger salaries. Rather, the focus has shifted from costly trappings and benefits packages to improving the quality of managers and company leadership. The real costs come from ignoring retention and having to cope with high turnover rates, she says.

And sometimes, all a retention program really needs is an honest-to-goodness statement that you value your employees. "If you're a company that feels like it has to write a check for retention, you've probably already missed the boat," Morello says.

Kosan is a freelance writer and editor in Beverly, Mass. She can be reached at lkosan@mediaone.net.

# pinions

Editorial

#### What would you pay for your favorite Web sites?

re you addicted to Yahoo Finance? How about CNN.com? The acid test is whether you would be willing to . pay for them.

The thinking du jour is that the Internet model we have developed is not sustainable.



Giving away massive quantities of data and trying to get advertisers to pay the freight made sense when banner advertising looked promising. But according to the Internet Advertising Bureau, only 0.25% of banner ads are clicked on today, vs. 8% in 1996.

That means companies from Yahoo to CNN.com are looking for new ways to bring in money. One option is to sell

content to service delivery companies, while another is to bill users directly.

As an example of the former, an executive with CNN.com said in a recent forum that his company is exploring selling content to delivery service firms such as Akamai. These firms, in turn, would sell that content to ISPs, which could charge customers for premium services or just compete on having faster, better access to the content.

How you get there from here is a huge conundrum. The first company to make the jump to a paid model might lose "viewers" to competitors that remain free. But then again, the choice may come down to making the leap or going out of business.

Another survival option might be to charge consumers a la carte for each service rendered, even if they only cost pennies. Although you hear less today about this micropayment approach, the idea seems to be alive and kicking at the World Wide Web Consortium.

If the micropayment options could be ironed out, who wouldn't be willing to pay a little bit for the Internet information sources to which they have become addicted? Maybe there will come a day when your browser holds the equivalent of a Mobil Speedpass, the little key fob that lcts drivers bill gas charges to their credit cards by waving the tag at the gas pump.

You would open an account with your favorite Web sources and your surfing activity would be reflected on your credit card bill.

While more far-fetched than the ISP bundling cheme, direct billing looks to be the future for things such as Microsoft's .Net services, so it may become second nature.

In cither case, it would appear the free Web ride is nearing the end.

> -John Dix Editor in chief jdix@nww.com

Message Queue

#### 15 YEARS

I enjoyed "Eating crow" (www.nwfusion.com, DocFinder: 3846), the article about flops in the network industry, and the other stories in your 15th anniversary issue. Congratulations on putting together such easy-to-read, informative and witty stories. I enjoyed the writers' tone, the succinct content and the easy navigation around each article and related stories in your Fusion Web site. Thanks and keep up the great work.

> Marishka Cross National product manager GoMail — Ansdoc Group Melbourne, Australia

Speaking of networking flops — What about the Micro Channel Architecture vs. EISA scrap that pitted IBM against Compaq, Hewlett-Packard and many others in the late 1980s and early '90s? While MCA was technically much better, it would have completely obsoleted the current installed base and required a huge immediate outlay of cash to take advantage of this new architecture. Thus, the slower EISA won the race. IBM just never seems to get it.

> Tom Hannigan San Jose

Regarding "15 events that changed networking" (www.nwfusion.com, DocFinder 3847): Not sure how you can talk about the history of networking without discussing Novell's contributions. Microsoft got networking so wrong the first few attempts that if it weren't for Novell, we would be way behind in the development of the network operating system.

> Jeff Kobut Evansville, Ind.

Regarding Howard Anderson's top 15 network technologies of the past 15 years (www.nwfu sion.com, DocFinder 3848): I disagree with Anderson's choice of the Apple Macintosh as the No. 1 technology.

PCs are easier to upgrade and you don't need special training to work on them. The GeForce 3 video card is the greatest invention of the past 15 years. That or playable demos that you can download before buying the retail version.

> Ben Gray Batavia, N.Y.

#### Costly spam

Regarding Mark Gibbs' "Backspin" column "The ethics of spam" (www.nwfusion.com, DocFinder 3849): Parker Byron is a spammer and his conduct should be against the law because it costs us money.

The collective resources of the Web are forced to add additional disk space and provide resources for bandwidth to endure spam. Someone has to pay for it. My ISP doesn't give out free accounts.

With "regular" junk mail, the sender pays for printing and postage. If you want to start World War III, just try forcing the recipients of junk mail to pay for the postage and printing, whether they like it or not.

The time it takes to delete spam isn't an issue. Spammers are getting a free ride at our expense.

> Kevin Thomas Systems analyst *InPro* Muskego, Wis.

#### Personality counts

Regarding Winn Schwartau's column "How to flush out the snakes before you get bitten" (www.nwfu sion.com, DocFinder: 3850): The toughest interviews I've had were the ones where I was asked an open-ended question and had to elaborate. There were no really wrong or right answers; they were studying my reaction and how I answered the question.

One of my bosses said you could train almost anyone, but you couldn't always find the right personality for the job. It's much more important to have new people blend in with the team than have any specific skill.

> Pat Haney Springfield, Va.

E-mail letters to jdix@nww.com or send Mike Keefe 2001 them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification





#### Telecom Catalyst . Daniel Briere and Beth Gage

#### Dude, where's my corporate strategy?

hen working with new ventures, start-ups or new businesses within existing organizations, the first question we want answered is "What are you all about?" Less than 10% of these companies can initially answer this question well. This led us to formulate four categories of "strategy-challenged" firms that we will explain in terms everyone understands: the movies.

- "Of Mice and Men." Like a rodent, the "Rat-Holer" has one way in, one way out. This type of firm defines itself so narrowly that, if the viability of its strategy fails or is taken to its fullest success, no options remain to move forward. An example of a Rat-Holer strategy is, "We're all about providing DSL to consumers." If faced with a powerful competitor that made it difficult to succeed in the consumer DSL market, this Rat-Holer would be "Gone with the Wind."
- "Breakfast at Tiffany's." The "Kitchen-Sinker" is a firm that says it is about everything but the kitchen sink. Like Holly Golightly, they're trying to find out who they are. A Kitchen Sinker defines itself so broadly it can never focus its resources to be great at one or

two things, and focus is critical to success. A typical Kitchen-Sinker strategy is, "We provide integrated solutions for small-to-midsize businesses." This is a fine strategy for Sprint, Verizon or AT&T, but it's a "Fatal Attraction" for start-ups.

- "It's a Wonderful Life." The "Apple Pie-er" has a strategy that sounds full of promise, but it provides absolutely no direction for where the firm should focus its development resources or which customers it should try to serve. A typical Apple Pie-er strategy is, "We enable service providers to accelerate profitability through cost savings and high-margin revenue streams." A noble calling but don't ask us what this company does or what will make it more successful than the other 347 companies with the exact same strategy.
- "Driving Miss Daisy." The final type of strategy-challenged firm is perhaps the most tragic the "Back Seat Driver." This firm is headed by an intelligent leader who has mapped out a well-focused strategy for suc-



cess. This "Easy Rider" has surrounded himself with a management team of other highly capable and creative people, all of whom have their own vision of the right path to success. "Turn left," shouts one. "Turn right," yells another. "Turn around!" screams a third. The leader spends so

much time leaning over the seat to argue the rightness of the strategy that there is definitely a "Sudden Impact" to come.

Most new ventures fall into one of these categories, but there is hope. Many strategy-challenged firms recover and become strategy-powered firms, having a clear sense of direction as well as rules to govern what drives that direction and what diverts from it. That speeds decision making, consensus building and profitability — and that's no "Catch-22."

Briere is CEO and Gage is vice president of Tele-Choice, a market strategy consultancy for the telecommunications industry. They can be reached at telecomcatalyst@telechoice.com.

Reality check. Thomas Nolle

#### PHOTOSUBDUCTION: CAN IT HELP OPTICS SURVIVE?

en years ago, UFO believers were fringe-area nuts with no credibility. Today, extraterrestrial life is a legitimate issue. That is so because of the concept of "cryptozoology," the study of nontraditional life-forms. We cloak a nutty idea in a nice name and the nutty concept is rehabilitated. Now as optical players announce piles of disappointing news, maybe we should try that in the optical arena, too. Enter "photosubduction."



Our basic problem with optical today is simple. People don't want to spend lots of their hard-earned money on new services so we can't turn all those wonderful dense wave division multiplexer-created bits into bucks. No service revenue,

no service expansion. Solving the problem of demand would fix our whole industry, including optics, but it would take quite a bit of time.

To keep optics rolling in, we need to find another value proposition to bridge the present into the (hopefully) demand-rich future.

Such a bridge value proposition does exist ... sort of. Optical gear has traditionally lived at the bottom of the classical Open Systems Interconnection stack of layers, and the real features and value of the network have been created by higher-layer electrical devices such as switches and routers. If optical gear could be made to absorb some of the valuable functions of those higher-layer devices (to "photosubduct" them), the capital cost of the electrical part of the network could fall, and that savings could justify deploying optical network elements.

It gets better. If optical smarts were to absorb electrical device features deep into the cloud, the management of those numerous edge and intermediary-layer electrical devices would be simpler because we could reduce the device count and the devices would be simpler.

There have been some attempts to promote smart optics. Consortiums such as the Optical Internetworking Forum and Optical Domain Service Interconnect have been looking at how to make optical network features addressable at the optical edge so electrical devices acting through custom service interfaces could invoke the features. All of this may be progress, but it makes optical features slaves to traditional network concepts such as topology discovery, route recovery and least-cost routing. What's the "least-cost" route in an optical network with essentially free bandwidth? There isn't any. Clearly plentiful capacity changes a lot of things, and clearly we aren't going to be able to create a strong value proposition for deploying it unless we start thinking in terms of the optical future and not the electrical past.

We need to throw out the whole OSI model concept of the network — the part of that venerable seven-layer model that extends from Layer 3 downward to Layer 1. We then need to consider just what kinds of feature support modern and evolving services would need from the network to facilitate the connection of users to each other or users to resources.

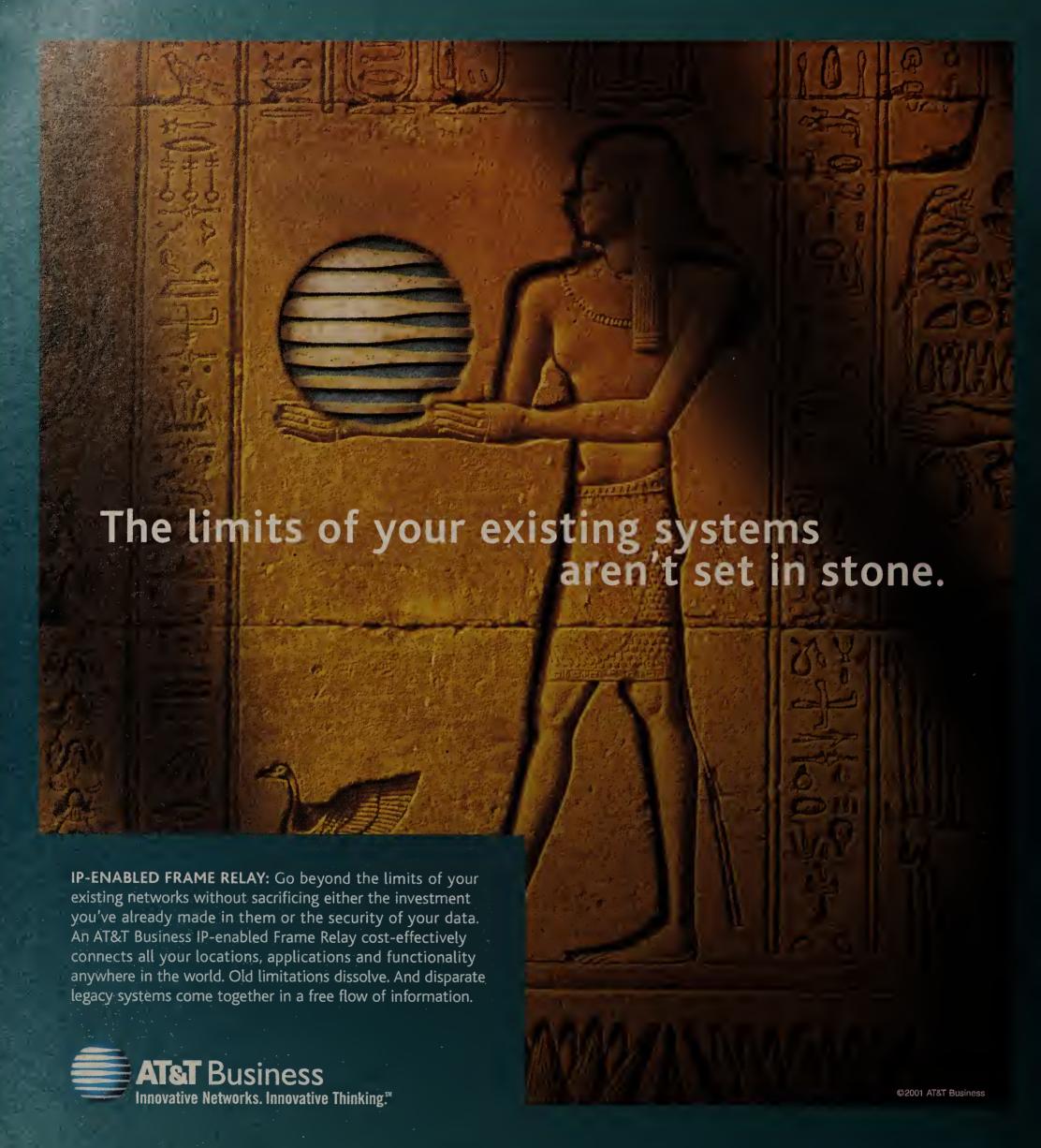
This is necessary because smart optics and lessexpensive bandwidth changes everything. Multiplexing saves money on wasted bandwidth, but if unit bandwidth cost is near zero, there's no cost to waste. There goes one of the major functions of Layers 2 and 3. Topology discovery for route management is a big part of routing and switching functionality, but in an age of cheap optical bits, we can absorb connection features and rerouting around faults into the optical layer. There goes most of the rest of the OSI model. Converge voice and data? Why, when there's no cost difference in sending packets and voice together or apart?

What we're on the verge of is a divergence of service and network. The sacred network protocol concepts of today, including ATM, frame relay and IP, are not really contenders for the "Network Architecture of the Future," they're just different user-network interfaces. Optical players have to believe in and support that view, or they can't establish their value in the network of today . . . and whoever doesn't sell in today's network is bankrupt before tomorrow's is built.

So why hasn't photosubduction happened? Ironically, it's been delayed by the market's desire for instant gratification.

We wanted to fit optics quickly into today's network paradigms to ensure that optical uptake in the market would be quick. Instead, we enslaved optics to electrical concepts that could never take full advantage of the new optical revolution. If optical players don't correct their mistakes soon, the most useful device they'll be able to make and sell will be a laser pointer — to point at the success of others.

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Choosing a network vendor requires as much knowledge of that company's financials as it does its products or services. But these days, following a company's financial maneuverings is harder than climbing out of a raging vortex. To keep tabs on this whirling mess, you'd need a team of experts dedicating their days to analyzing your vendors' financial positions.

Because the likelihood of that happening is zilch, consider this Signature Series edition, the Network World 200 Issue, your own financial analysis tool. In these pages, you'll find our annual ranking of the biggest 200 companies in networking, by revenue, and an in-depth explanation of what's transpired for these vendors throughout last year (page 54). Plus, you get our annual forecast of how three critical enterprise network markets will fare this year (page 77), our picks for 10 start-ups that we think have the gumption to last in this down economy (page 83) and more articles to help you effectively deal with vendors.

But that's just the beginning. Jump online to our special NW200 portal for a slew of tools to track the industry. At www. nwfusion.com/nw200/2001, you can sort NW200 companies by profitability, market capitalization and other criteria. You can compare vendors, view historical performance, and track the ups but mostly downs of the NW200 Stock Index.

Then, once you've researched your vendors, be sure to have some fun, too. Go to www.nwfusion.com, DocFinder: 3933 to participate in our "Guess the Desk" contest. A little levity in these swirling times will help us all.

> - Beth Schultz Editor, Signature Series bschultz@nww.com



The Network World 200 Issue is one of six bimonthly supplements providing insights, opinions and information on the biggest trends shaping the networked world. Find out all about your job, salary, future and free time in our next installment, the You Issue, coming July 23.



#### **54** Winds of change

Sales for the NW200 were surprisingly strong in 2000 despite the market turmoil, but the horizon looks bleak.

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### **Network World 200 online**

Visit the NW200 portal for more tools to help you analyze your vendors' financial health. At www.nw fusion.com/nw200/2001, you'll be able to:

Download the NW200, our ranking of the top 200 companies in networking by revenue.

View NW200 leaders on profitability, research and development spending, international sales and other criteria.

Compare two or more NW200 companies.

Use the NW200 Stock Index to track the network industry's stock performance.

Download industry-specific charts.

Get downloadable status reports on the 2000 and 2001 start-ups

Read about how to resolve vendor problems quickly, then download a problem-resolution flowchart.

Play a game: Guess which desks belong to which CEOs.

Access breaking financial news, newsletters, vendor profile pages, layoff news, a venture capital database and more.



# Charles for the NW200 were surprisingly strong in 2000

Sales for the NW200 were surprisingly strong in 2000 despite the market turmoil, but the horizon looks bleak. By John Dix

iven the gloom and doom that settled in after the stock market bubble burst in April 2000 and the economy began heading south, it's surprising the Network World 200 finished the year with revenue up 14%. That's the same heady growth enjoyed in 1999.

Sales for the group — the 200 largest U.S. network companies based on revenue — reached \$909 billion, a \$110 billion gain from the year before. This is the second year in a row NW200 companies collectively increased their intake by more than \$100 billion.

But profits tanked, dropping to \$63 billion, 9% lower than the \$69 billion the NW200 posted in 1999. Expressed as a percentage of revenue,

NW200 profits were 6.9% last year vs. 11.6% for 1999. Nearly half of the

companies — 91 of them — reported losses in 2000.

Of course, the NW200 spans a range of companies, from \$88 billion behemoth IBM at the top to \$60 million Mobius Management, a comparative mouse at the bottom. It is a list of haves and have-nots.

As a rule, the heavy hitters typically enjoy slower revenue growth but are more profitable. The 69 NW200 companies with revenues of \$1 billion or more saw sales climb

12% last year and profits scale even more, to 16%.

The 131 companies with less than a billion dollars in revenue enjoy faster growth, but many are still in investment mode or are outright floundering. These companies saw sales spike 47% last year, but losses climbed to \$23 billion from \$5 billion in 1999. Of the 91 companies in the red last year, 77 fall into this group.

Added up, it would appear the souring economy didn't go bad fast enough to ruin the top-line numbers of the NW200 last year. But it certainly squeezed profits for the smaller guys and left everyone peering furtively over the horizon at 2001.

Where the spiraling economy took its toll is in stock value. At the height of the irrational exuberance last year, the value of the NW200's outstanding shares passed \$5 trillion. Today, 46% of that wealth

has evaporated. As of March 9, 2001, the market capitalization of the NW200 was

\$2.7 trillion. While that's still an oversized number — close to the \$2.9 trillion gross domestic product of Japan — the loss of market muscle will curtail the efforts of acquisitive companies.

Take Cisco. The network kingpin swallowed 23 companies in 2000, including big Web switching fish ArrowPoint for \$5.7 billion. But Cisco will find it hard keeping pace, given that the value of its stock is down \$322 billion from this time last year to \$148 billion today. (Cisco's market value actually reached \$555 billion at one point last year.)

Sinking stock aside, Cisco fared well in 2000. Other core infrastructure players had a tougher go of it. But the industry most in turmoil was telecom, which was rocked from bottom to top.

#### Telecom smackdown

Where to start? C.Michael Armstrong's grand plan for AT&T disintegrated, forcing the CEO to break up the company — again. At WorldCom, after his audacious play for Sprint flopped, CEO Bernie Ebbers followed AT&T's lead by cleaving his company in two. Qwest Communications completed the US West acquisition, leaving only three of the original seven Bell companies standing. One of those three, Bell Atlantic, merged with GTE to form a national company, Verizon, and waded into long-distance in two markets. The competitive local exchange carrier (CLEC) party exploded with virtually no warning, leaving the industry shaky, but perhaps stronger. And a host of DSL upstarts went belly up.

The long-distance industry is still beset by the faster-than-anticipated decline in business and consumer voice revenue. AT&T says its business service revenue for 2000 climbed 3.3% to \$28.4 billion primarily on the strength of data/IP and outsourcing sales, but falling voice revenue offset that growth.



While voice traffic is growing by "mid-single digits," AT&T reports, price competition is reducing longdistance voice revenue at a "low teen rate."

On the consumer side, AT&T's voice service revenue declined 9.5% to \$18.9 billion for 2000. Worse, it dove 9% from the third quarter to the fourth, and consumer voice sales were off 15% from fourth quarter 1999 to the same period in 2000.

This is, after all, why Armstrong has scrambled to get the company into broadband cable. He needs a revenue stream to make up the difference. Those efforts are slowly beginning to pay off. AT&T broadband sales climbed 10% last year to \$9.6 billion. The company says it has 1.1 million high-speed data subscribers (adding 3,800 per day), some 560,000 broadband telephony customers and 2.9 million digital video customers.

But the convergence is apparently not happening quickly enough to offset the weight of the voice loadstone.AT&T, second on the NW200 list, finished the year with sales up 5% to \$66 billion but profits down 43% to \$3.1 billion.

With profits in decline and the company's stock swooning, Armstrong took radical action in October when he broke the company into four pieces: AT&T Wireless (which already had its own tracking stock), AT&T Broadband, AT&T Business and AT&T Consumer. It's likely that the Broadband, Business and Consumer units also will get their own tracking stocks one day.

One of the brightest spots on AT&T's balance sheet is wireless. Sales last year were up 37% to \$10.4 billion. Although AT&T Business only grew 3.3%, you can find strengths here, too, if you drill down. Revenue for IP services, including VPN offerings, grew in the "mid-40%" range in the fourth quarter last year, the company reported. "On a combined basis, packet services (frame relay, ATM and IP) grew around 40% for the quarter."

Data is also the strong suit at WorldCom, which broke in two last November in an effort to box off the slow-growth voice business. The company still carries the WorldCom name but has two separately traded tracking stocks: WorldCom Group, which includes the high-growth data businesses and international; and MCI Group, which serves consumers, small business and dial-up Internet users.

A quick glance at the two units' results makes it clear what fueled the need for change. After reworking the books to reflect the new organizational structure, WorldCom Group finished the year with revenue up 19% to \$22.8 billion and net income of \$2.9 billion, up from \$2.3 billion last year.

By comparison, MCI Group finished the year with sales of \$16.3 billion, essentially the same as the year before, and net income of \$1.8 billion, slightly up from \$1.6 billion in 1999. But the fourth quarter in 2000 was bleak. Revenue fell to \$3.8 billion from \$4.2 billion in the same quarter in 1999, even as the company eked out net income of \$125 million.

Stitched together, WorldCom, seventh on the

#### Value-packed NW200 companies

These companies had the highest market capitalization as of March 9, 2001.

2000 rank	Company	Market cap in millions
14	Microsoft	\$302,450
10	Intel	\$197,820
28	AOL Time Warner	\$182,960
1	IBM	\$174,190
4	SBC Communications	\$152,320
17	Cisco	\$148,580
3	Verizon	\$128,990
20	Oracle	\$91,470
2	AT&T	\$88,620
12	BellSouth	\$77,710
23	EMC	\$75,160
13	Dell	\$60,470
5	Hewlett-Packard	\$58,770
19	Sun	\$56,840
16	Qwest Communications	\$55,980

NW200, finished the year with sales up 9% to \$39.1 billion. If WorldCom had won governmental approval for its bold plan to acquire Sprint last year, it would have weighed in at roughly \$56 billion, up there with the biggest telecom players.

For the first time, carriers hold three of the top four NW200 slots: AT&T (2), Verizon (3) and SBC Communications (4). The latter two achieved this rank through mergers. Verizon is the byproduct of Bell Atlantic (which bought Nynex in 1999) merging with GTE last year. And over the years SBC, the old Southwestern Bell, has acquired Pacific Telesis, Ameritech and Southern New England Telecommunications, among other properties.

Owest took US West out of the Bell picture when it completed that acquisition last July, leaving just two mega-Bells — \$64.7 billion Verizon and \$51.2 billion SBC — and the less acquisitive BellSouth, a \$26.1 billion company.

Make no mistake, the mega-Bells are big. Verizon claims it serves one out of every three telephone lines in the country and two-thirds of the top 100 markets. Through its joint venture with Vodafone, it offers wireless service in 96 of the top 100 markets.

When federal and state regulators let the mega-Bells get serious about long-distance, the landscape could change drastically. Verizon and SBC officially started to dabble in long-distance last year, but neither have much to show for it yet.

The biggest change in the local exchange market was the CLEC collapse. Many of the companies booming last year are either on the brink or already bust; victims of huge debts run up when demand for the services

they were building seemed limitless. Reality has since settled in, and the funding needed to execute each company's grand vision has dried up.

Two years ago, Winstar Communications, a CLEC using wireless broadband technology, was one of the two fastest-growing NW200 companies. Last year, the company did fairly well saleswise; it ran revenue up 70% to \$759 million. But like other CLECs, it was bleeding red ink in 2001 — a staggering \$1 billion. Last week the company threw in the towel and declared bankruptcy.

Another CLEC straddled with debt and struggling to raise cash is Teligent, 149 on the list. Last fall, Teligent said it had enough cash to fund operations into the second quarter, ending June 30. One more barometer of health: As of this writing, its stock is trading at 44 cents.

ICG Communications, 84 on the NW200 last year, and e.spire Communications didn't make it. ICG filed for Chapter 11 bankruptcy in November, and e.spire, although making this year's NW200 at No. 103, followed suit in March.

Issa Mikel, an analyst with The Yankee Group, says when the dust settles only a handful of strong CLECs will be left, and that's good."There was a lot of overcrowding," he says, adding that the survivors will have diversified service offerings and less debt. "I'm optimistic about the CLEC future."

Not even a focus on data can save some of these competitive upstarts. Witness the failure of many of the DSL carriers. Covad Communications, the fastest-growing NW200 company last year, didn't even make the chart this year because in its tenuous situation, it hasn't yet officially closed the books on 2000.

While Covad is still in business, its stock is hovering near \$1. Its primary competitors aren't faring any better. Rhythms NetConnections is hanging on by a shoestring, its stock floating around 25 cents. And after filing for bankruptcy in January, North-Point Communications sold its network to AT&T last month, laid off 70% of its employees and lost its top executives. And these are the big national DSL players. Many of the smaller regional companies, such as Vitts and HarvardNet in the Northeast, have called it quits. Mikel is less optimistic about DSL-only carriers because the margins are simply too thin.

#### Infrastructure cracks

The failure of the CLECs and DSL carriers has had a ripple effect on the infrastructure players, many of which gave the upstart carriers ridiculously attractive terms on equipment when the future for these carriers was still bright.

> Lucent blames some of its current woes on that misstep. The company's sales were up 10% to \$33.8 billion last year, but profits dove 75% to \$1.2 billion.



The company is scrambling to reorganize under a new CEO and just posted a \$1 billion loss for the first fiscal quarter of 2001.

But even Cisco, which managed to drive sales up 55% last year to \$18.9 billion, only mustered 32% profit growth, partly because of the credit problem.

Although Cisco and most other equipment suppliers now demand the equivalent of cash on the barrelhead for new equipment, the bigger problem is the soft market. If you take CEO John Chambers at his word, times are bleak. Last week Cisco announced that third-quarter revenue would be down about 30% compared with second-quarter revenue. The firm also said it would lay off 8,500 people. Chambers has said the next two quarters look soft, too.

Saleswise, routers and switches each account for 40% of Cisco's business, with access products weighing in at 13% and the remainder falling into "other."

When Cisco first set its sights on telecom as a new market opportunity, everyone asked, "What chance does little Cisco have against the likes of Lucent, Nortel and big international players Siemens and Ericsson?" While Cisco still lacks some of the technology to go up against the biggest players, and the world isn't retreating from circuit switching quite as fast as some once expected, the difference in size is eroding.

Five years ago, Cisco was a \$12 billion company and Nortel \$22 billion, a difference of 83%. Said another way, Cisco would have had to nearly double in size to catch up. Today Cisco is \$18.9 billion and Nortel is \$30.3 billion, a difference of 60%. You can bet Nortel CEO John Roth is constantly looking in his rearview mirror. In Securities and Exchange Commission documents, Nortel lists Cisco as a primary competitor in almost every major market segment.

Because Lucent spinoff Avaya can't seem to articulate a good enterprise data network strategy, Nortel is really Cisco's biggest enterprise competitor. The enterprise hunk of Nortel's business is only 18% of sales, but that equals an impressive \$5.3 billion. Stealing a page from Cisco's book, Nortel has been on an acquisition binge for the past three years, evidence of which

## Juniper branches out, grows wildly

Juniper Networks lords over the list of fastest-growing Network World 200 companies that had 2000 revenue of \$500 million or more.

uniper Networks' IP vision of a single IP infrastructure serving all kinds of networked applications paid off in 2000. On that vision, it delivered five hardware platforms and seven software releases since its founding in 1996. This earned the company a solid reputation among service providers — 225 are its customers — and helped make Juniper the fastestgrowing Network World 200 company among those with revenue of \$500 million or more in 2000.

Juniper closed 2000 with \$674 million in revenue, a 556% increase over 1999 revenue of \$103 million. Such results put Juniper ahead of Exodus Communications, No. 2 on the list of fastest-growing companies with revenue of \$500 million or more. In comparison, Exodus hit a 238% increase from 1999 to 2000. Juniper's revenue lands it at the No. 83 spot in our NW200 ranking.

A growing market put Juniper over the edge last year, says Marcel Gani, CFO at the Sunnyvale, Calif.,

Internet backbone router vendor. Previously, most of Juniper's revenue came from top-tier service providers.

But in 2000, the company began conducting business with a wider variety of service providers, many of them small. He says only one customer accounted for more than 10% of revenue last year.

Juniper may find it tough maintaining such growth in 2001, given the troubles hounding many service providers, but did well in the first quarter. It posted revenue of \$332.1 million, up 420% over the same period in 1999.

And Wall Street believes Juniper will continue to grow faster than its competition. Analysts predict the company will about double its earnings for the calendar year 2001, compared with a 35% reduction expected industrywide, according to online stock research sites.

— Beth Schultz

shows up in its revenue and profit: Sales were up a staggering 42%, but the cost of all that activity resulted in a \$3.5 billion loss for 2000.

Since February, Nortel has announced it would cut 15,000 jobs.

For the most part, 2000 was kind to many of the core enterprise infrastructure players. The NW200 numbers for Cabletron look promising but, because of the company's odd February fiscal close, are essentially for a period in 1999 so have to be discounted. But the firm's third-quarter results, for the period ending Dec. 2, also

show advances. Revenue for the four operating companies Cabletron formed out of its existing business in 1999 were up 10% to \$265 million.

The bulk of that revenue is from Enterasys, the company that sells enterprise network gear. Sales were up 8% to \$206 million in the quarter. Enterasys' year-over-year growth for the quarter was up 20%.

3Com's drastic reorganization, on the other hand, isn't going so well. After spinning off Palm in July, giving up on the enterprise core See **NW200**, page 58

#### Hot growth companies

Revenue at these NW200 companies grew the most from 1999 to 2000

110111	1333 to 2000.					
2000 rank	Company	•	ue Ilions) 2000	1999-2000 revenue growth		
176	Akamai Technologies	\$4	\$90	2,152%		
131	Sycamore Networks	\$11	\$198	1,649%		
98	Commerce One	\$34	\$402	1,097%		
164	Kana Communications	\$14	\$119	748%		
159	Interwoven	\$17	\$132	686%		
163	VA Linux Systems	\$18	\$120	579%		
187	Blue Martini Software	\$11	\$74	561%		
83	Juniper Networks	\$103	\$674	556%		
197	Novatel Wireless	\$10	\$61	540%		
115	Ariba	\$45	\$279	515%		
88	VeriSign	\$85	\$475	460%		
190	InterNap Network Services	\$13	\$70	456%		
148	Teligent	\$31	\$152	386%		
196	Mail.com	\$13	\$61	382%		

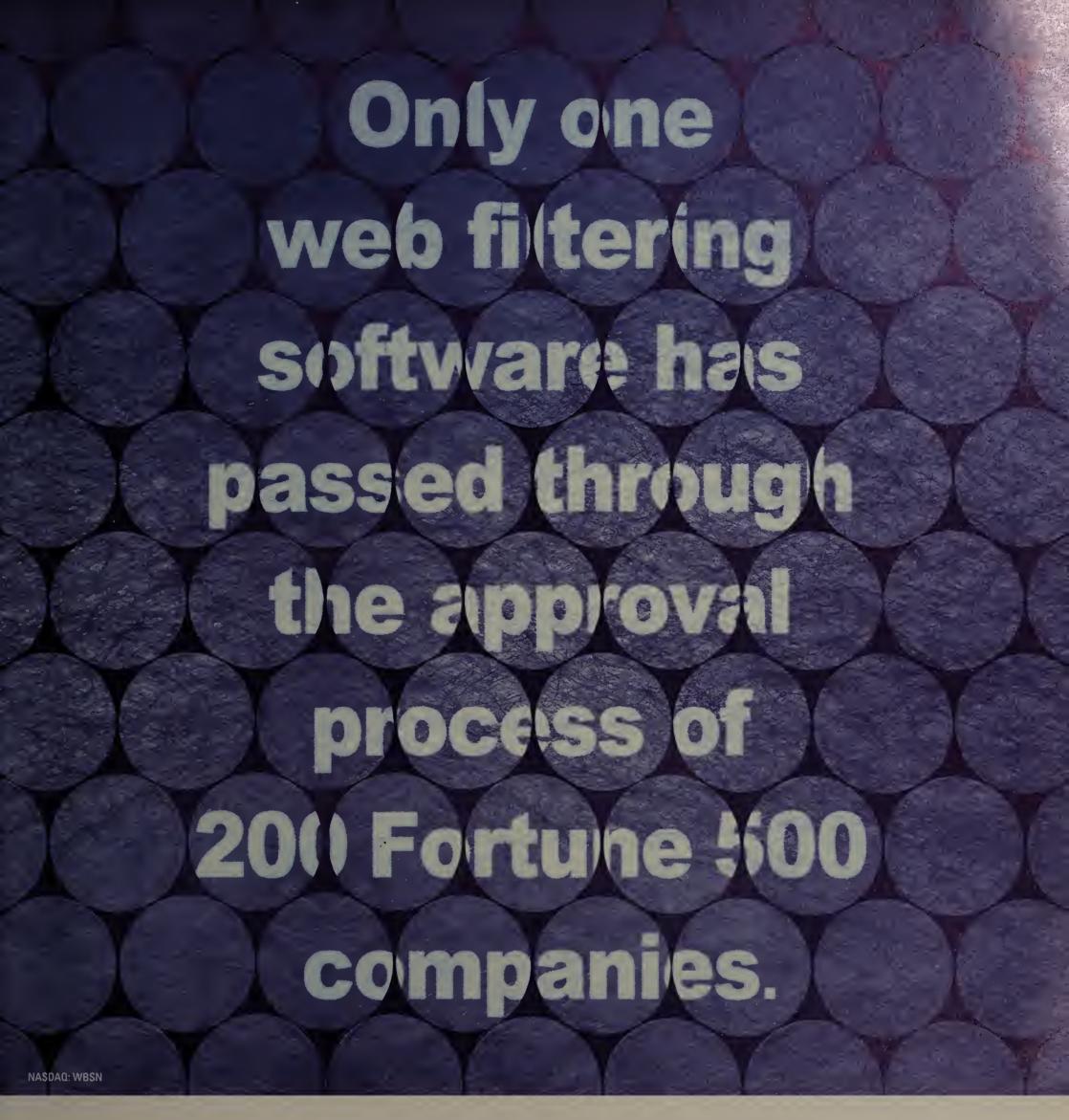
Revenue grew the most from 1999 to 2000 at these NW200 companies earning \$500 million or more.

2000 rank	Company	2000 revenue (in millions)	1999-2000 revenue growth
83	Juniper Networks	\$674	556%
77	<b>Exodus Communications</b>	\$818	238%
82	XO Communications	\$724	164%
35	Global Crossing	\$3,789	154%
61	Level 3 Communications	\$1,185	130%
47	Siebel Systems	\$1,795	121%
60	Veritas	\$1,207	103%
86	Network Appliance	\$579	100%
67	Palm	\$1,058	88%
45	Broadwing	\$2,050	86%
75	Ciena	\$859	78%
79	Winstar Communications	\$759	70%
63	Genuity	\$1,137	61%
17	Cisco	\$18,928	55%

Revenue at these NW200 companies grew the most from 1995 to 2000.

2000		Revenue		1995- 2000
rank	Company	1995	2000	CAGR*
88	VeriSign	\$0.4	\$475	312%
103	e.spire Communications	\$0.4	\$344	289%
96	BroadVision	\$0.5	\$414	277%
133	Internet Security Systems	\$0.3	\$195	265%
77	Exodus Communications	\$1.4	\$818	258%
90	BEA Systems	\$0.8	\$464	257%
70	EarthLink	\$3.0	\$987	219%
47	Siebel Systems	\$8.0	\$1,795	195%
16	Qwest Communications	\$125.1	\$18,954	173%
137	New Era of Networks	\$1.3	\$188	172%
123	Real Networks	\$1.8	\$242	166%
161	Beyond.com	\$1.0	\$122	161%
163	VA Linux Systems	\$1.1	\$120	156%
195	Webtrends	\$0.6	\$61	149%

\* Compound annual growth rate

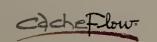


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## Big growth, through acquisition or otherwise

Nortel Networks and Dell top the Network World 200 list of companies that gained the most actual revenue in 2000. But sometimes growth doesn't equal health.

ow do you define success? If ever a company epitomized this quandary, it is Nortel Networks.

On the one hand, Nortel increased its actual-dollar revenue more than any other Network World 200 company. Nortel's 42% revenue increase equals almost \$9 billion, landing total 2000 revenue at \$30.3 billion, up from about \$21.3 billion in 1999. With that, Nortel climbed two spots on the NW200, to No. 11.

On the other hand, Nortel posted a \$3.5 billion net loss in 2000. It was the only company among the top 20 NW200 firms that reported a loss in 2000.

Nortel attributes the loss to costs incurred from its three-year buying spree. Since 1998, it's been on an acquisition binge. In 2000, Nortel gobbled up Alteon WebSystems, Architel Systems, Clarify, CoreTek, EPiCON, Promatory Communications, Qtera, Sonoma Systems and Xros. These purchas-

es, which gained Nortel optical network technologies and components, content switching and more, should begin generating revenue for the company this year.

Nortel can't grow as fast in 2001 as it did in 2000 and has gotten a black eye



by saying it would come close (see related story, page 99).

And then there's Dell. Relying on the same business model it has since inception, Dell landed second on the NW200 list of companies with the most actual revenue growth. Its 30% revenue growth in 2000 translated into slightly more than \$7 billion, bringing total revenue to \$25.3 billion and earning Dell the No. 13 spot on the NW200.

Unlike many NW200 companies that spent the late 1990s on buying sprees, Dell completed its first-ever acquisition just last year. It picked up emerging storage-area network company Converge-Net and, in so doing, pushed further into the enterprise storage market.

Yet storage was not Dell's biggest source of growth. Strong sales of its PowerEdge servers in the enterprise market holds that honor, says Gene Austin, a vice president of worldwide marketing.

"We maintained our aggressive price position. Our pricing strategy is a direct result of our maniacal focus on costs and our direct model," he says. "Despite the slowing economy, our model enabled us to keep inventories low and profitability up."

- Julie Bort

#### NW200, continued from page 56

switching market and making a brief run at the consumer Internet appliance business, 3Com is yet again retreating. It, too, has an odd fiscal year (ending in June), so the numbers in the chart only tell half the story. While fiscal 2000 showed sales down 17% to \$4.3 billion and profits of \$674 million, more telling are the third-quarter results posted last month.

Third-quarter revenue was down 18% to \$629 million, and the company reported a pro

#### Marked productivity

These NW200 companies earn the most revenue per employee.

2000 rank	Company	Revenue per
rank	Company	employee in 2000
67	Palm	\$1,112,089
24	Apple	\$931,723
154	Datalink	\$883,135
152	Emulex	\$873,575
104	Polycom	\$828,255
102	Prodigy Communications	\$792,326
161	Beyond.com	\$745,439
83	Juniper Networks	\$726,538
36	Anixter International	\$702,880
13	Dell	\$692,192
159	Interwoven	\$674,128
101	Foundry Networks	\$659,362
40	Compucom Systems	\$658,561
56	Quantum - DLT & Storage Grou	p \$616,900
113	Copper Mountain Networks	\$614,795

forma net loss (which excludes some restructuring charges) of \$122.8 million. 3Com laid off 1,200 employees in February and, with the announcement of these quarterly results, said it would close its recently established consumer Internet appliance business. CEO Bruce Claflin is now looking for a way to save \$1 billion by the end of fiscal 2002.

Two brighter spots on the infrastructure scene are Gigabit Ethernet players Foundry Networks and Extreme Networks. Both reported strong 2000 results, even if their stock prices have plummeted.

At its 52-week high on March 21, 2000, Foundry's shares were trading for \$146. As of press time, they were going for around \$9. That, even though Foundry, 101 on the NW200, drove sales up 182% last year to \$377 million while pulling down a profit of \$88 million. Extreme, 118 on the list, pumped sales up 167% to \$262 million and brought in profits of \$20 million. Its stock, which peaked in October at \$128, was trading at \$17 at press time.

Echoing Cisco's gloomy outlook, Foundry said last month that first-quarter product orders were lower than anticipated because of "decreased or delayed capital spending."

#### Solid servers

On the computing infrastructure side of the market, the most notable change was plucky Dell leapfrogging Microsoft on the NW200 list, jumping up to the 13th slot.

Dell posted another incredible year, with sales up 38% to \$25.3 billion and profits up 14% to \$1.7 billion. Sales of the company's enterprise systems, including servers, workstations and storage gear, were up 81% last year,

#### MORE COMPANY DATA

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■ Biggest R&D expenditures: DocFinder: 3937

and notebook sales climbed 61%.

Dell claims that online sales generate nearly 50% of revenue, a whopping \$40 million per day, up from \$14 million per day in 1999.

At Compaq, the third-largest computer maker and No. 6 on the NW200, the financial picture looked better in 2000 but not quite as rosy as for archrival Dell. New management put in place in 1999 ratcheted revenue up 10% to \$42.4 billion and drove expenses down 3% but only mustered a paltry \$569 million in profits. That's 1% of revenue and the same amount of profit the company posted the year before.

Five years ago, Compaq had revenue of \$20 billion and a profit of \$1.3 billion, a margin of 7%. It's had a rocky time since its Digital Equipment acquisition in 1998; Compaq closed that year with a \$2.7 billion loss. History will not look kindly on the Compaq-Digital marriage.

Hewlett-Packard, No. 5 on the NW200, may be the mover to watch this year. The company is newly focused under CEO Carly Fiorina, who is coming up on her second anniversary with the company. Sales for 2000 were up 15% to \$48.8 billion and profits up 6% to \$3.7 billion.

In the company's annual report, Fiorina says
HP has overhauled much of its server product

See **NW200**, page 60



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NW200, continued from page 58

line and that this effort began to pay off in the second half of 2000, when corporate account business was up 28%.

With the decks cleared (HP spun off much of its test and measurement business previously), the company can focus its considerable weight on its strengths, everything from midrange servers to high-end Unix boxes and storage-area network products.

Hardware revenue at IBM, the granddaddy of computing infrastructure and perennial No. 1 on the NW200, was flat for 2000. While CEO Louis Gerstner must worry about that, he is somewhat insulated because he has transformed IBM to the point where 37% of revenue comes from services today. Hardware is 43% of sales, software 14% (the remaining 6% falls in "other").

IBM says it signed contracts last year for \$55 billion in outsourcing deals, with 60 of those being worth in excess of \$100 million and six exceeding \$1 billion.

Tucked inside Global Services is what IBM flatly calls "the largest business and technology consultancy" in the industry. The company's 50,000-plus consultants billed more than \$10 billion in revenue last year.

Added up, IBM sales only inched up 1% to \$88.4 billion, while profits climbed 5% to \$8.1 billion. The company says international currency exchange rates depressed its revenue gain, which otherwise would have been 4%.

In software, IBM notes a few things of interest. One, middleware is hot. It says sales of its MQSeries messaging software were up more than 60%, and sales of its WebSphere e-commerce middleware tripled year over year.

IBM also says it is investing \$1 billion in Linux and dedicating 1,500 programmers "to enable every IBM hardware and software product" for that open source operating system. The goal, IBM says, is "to accelerate its adoption as a platform that can support heavy-duty enterprise workloads."

#### Softer side

Perhaps efforts such as IBM's backing of Linux have dragged down Microsoft's returns. Microsoft sales were only up 16% last year to See **NW200**, page 62

#### Booming employment

Through acquisition or plain old buildup, these NW200 companies added considerable numbers of employees in 2000

or emp	noyees in 2000.	
2000		No. of employees
rank	Company	'99-'00 % change
16	Qwest Communications	550%
98	Commerce One	489%
88	VeriSign	484%
60	Veritas Software	406%
110	Avocent	343%
115	Ariba	335%
105	Brocade Communications	331%
131	Sycamore Networks	297%
191	SonicWall	285%
187	Biue Martini Software	285%
164	Kana Communications	256%
96	BroadVision	253%
163	VA Linux Systems	237%
155	Vitria Technology	193%
176	Akamai Technologies	180%

000		2000		2000		2000		2000	
ank	Company	rank	Company	rank	Company	rank	Company	rank	Сотрану
33	3Com	98	Commerce One	35	Global Crossing	126	MTI Technology	180	Research in Motion
92	Acterna	72	Commscope	183	Globix	43	National Semiconductor	114	RSA Security
186	Active Voice	6	Compaq	170	Handspring	31	NCR	149	Santa Cruz Operation
78	Adaptec	40	CompuCom Systems	46	Harris	188	Net2Phone	4	SBC Communications
38	ADC Telecommunications	30	Computer Associates	5	Hewlett-Packard	169	NetManage	50	Scientific-Atlanta
58	Adobe Systems	138	Computer Network Technology	26	Hughes Electronics	175	Netopia	144	SCM Microsystems
91	Adtran	22	Computer Sciences	124	Hummingbird	179	NetScout Systems	47	Siebel Systems
176	Akamai Technologies	42	CompuWare	106	Hypercom	86	Network Appliance	41	Silicon Graphics
27	Alitel	59	Cornverse Technology	1	IBM	81	Network Associates	1.84	Silverstream Software
53	American Power Conversion	174	Concord Communications	87	Infonet Services	127	Network Equipment Technologies	191	SonicWall
68	Andrew	158	Convergent Communications	73	Informix	137	New Era of Networks	18	Sprint
36	Anixter International	113	Copper Mountain Networks	128	Inktomi	32	Nextel Communications	146	Standard Microsystems
28	AOLTime Warner	145	Corel	10	Intel	95	Norstan	44	Storage Technology
24	Apple	192	Cylink	143	Interliant	11	Nortel Networks	19	Sun
185	Applied Theory	154	Datalink	190	InterNap Network Services	197	Novatel Wireless	51	SunGard Data Systems
115	Ariba	173	Davex	97	Inter-Tel	62	Novell	71	Sybase
85	Aspect Communications	13	Deil	112	InterVoice-Brite	177	Open Market	131	Sycamore Networks
2	AT&T	139	Digex	159	Interwoven	165	Open Text		Symantec
182	Auspex Systems	157		133	Internet Security Systems		Oracle		Symbol Technologies
	Avaya	109	DMC Stratex Networks		J.D. Edwards		Palm		Tektronix
110	Avocent	132	Documentum	199	JetForm	122	Paradyne Networks	148	Teligent
171	AVT	162	Dot Hill Systems	83	Juniper Networks		PeopleSoft		Tellabs
	BEA Systems		e.spire Communications		Kana Communications	119	Peregrine Systems	120	Tibco Software
	Belden		EarthLink		Legato Systems		Perot Systems		Tut Systems
12	BellSouth		EDS		Level 3 Communications		Polycom		Unisys
161	Beyond.com		EMC		Lexmark		Printronix		USinternetworking
	BindView	152	Emulex		Lucent		Procom Technology		VA Linux Systems
	Blue Martini Software		Entrust Technologies		Mail.com		Prodigy Communications		Venlink
	BMC Software		Epicor Software		Manugistics Group		Progress Software		VeriSign
	Borland Software		eShare Communications		McData		Proxim		Veritas Software
	BroadVision		Exabyte		McLeodUSA		Ptek Holdings		Verity
	Broadwing		Excite@Home		Mercatur Software		Qualcomm		Verizon Communications
	Brocade Communications		Exodus Communications		Mercury Interactive		Quantum - DLT & Storage Group		Vitria Technology
	Brooktrout		Extreme Networks		Micromuse		Quest Software		VTEL
	Cabletron		F5 Networks		Micron Electronics		Qwest Communications		WatchGuard Technologies
	Check Point Software		Filenet		Microsoft		Rainbow Technologies		Webtrends
	Ciena		Foundry Networks		Mitel		Real Networks		Williams Communications Grou
	Cisco		Gateway		Mobius Management		Redback Networks		Winstar Communications
	Citrix Systems		*		- N				
	Cognos		General DataComm Genuity		Motorola MRV Communications		Remec Remedy		WorldCom XO Communications

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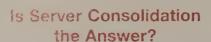
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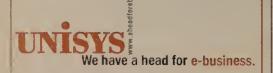
But there's a problem. "The far-flung servers that have sprung up across the enterprise, often for point applications such as e-mail, can't support expected growth or user demand," says Neil Ross, Program Director, Unisys Consolidation Solutions. "Supporting all the servers is getting expensive while consuming increasingly scarce IT personnel."

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faceted thing. It can involve consolidation of common processes and management. It can involve placing all servers in one room for more efficient administration. Or it can involve replacing several small servers with larger ones, like the Unisys ES7000. In all cases, the best solutions are services-oriented.

Get more information on server consolidation at a special interactive Webcast on May 4, 2001 at 10 a.m. EST. To register, visit www.unisys.com/ebiz/webcasts.





NW200, continued from page 60

\$22.9 billion, compared with the 29% and 28% growth the company enjoyed for the prior two years.

Even the release of Windows 2000 didn't distract attention from the biggest software story of the year — the rise of the application service provider (ASP) market. While our bold 2000 prediction that many pure-blood ASPs would grace the NW200 this year hasn't come to pass, Interliant (No. 143) remains on the list, and USinternetworking (No. 166) joins it.

Interliant finished the year with sales up 236% to \$158 million and a loss of \$151 million, while USinternetworking's revenue climbed 208% to \$110 million on a loss of \$175 million.

But the failure of many ASPs has the market questioning the sector as a whole. This, combined with the fall in technology stocks, has whipsawed these two companies. Shares in either company can be had for around \$1 today.

Rarely has a technology concept come on so fast and then self-corrected so quickly. The good news is that this should leave a few stronger players. although the consolidation process probably hasn't fully run its course.

Speaking of corrections, it is hard to remember a time when the network market as a whole slammed on the brakes as dramatically as it did at the end of 2000. SmartMoney.com says Cisco's Chambers saw evidence of a slowdown in December and the sky darken even more in January. Then "the lights went out," SmartMoney.com quotes Chambers saying. "There's no question we got knocked on our tails."

While some would have you believe this is a passing spring storm, others say the climate might not improve until the fourth quarter. Hopefully the NW200 companies have the hatches battened down.

## Riding high on content delivery

Akamai tops the Network World 200 in revenue growth, thanks to big gains in customers and a speedy network buildout.

ontent delivery network powerhouse Akamai Technologies earned this year's title of fastest-growing company on the Network World 200, our annual ranking of the biggest U.S. network companies. The No. 176 NW200 company expanded revenue an astounding 2,152% from 1999 to 2000, jumping from \$4 million to \$90 million. That revenue came from all-out selling: It closed 2000 with 3,675 customers, up from the 227 customers in the year prior.

Simultaneously, the company grew its network to roughly 8,000 servers inside 473 service provider networks in 55 countries as of year-end 2000. In 1999, Akamai operated just 2,000 servers on about 100 networks in 40 countries.

Even as it expands its network, the Cambridge, Mass., company insists it is moving closer to profitability.

"We have a large global network already in place, and therefore new revenue comes on at higher margins," says CEO George Conrades.

Still, Akamai reported a net loss of \$886 million in 2000. Whether Akamai can maintain the fast-paced growth it needs to get into the black remains to be

seen. The company announced April 4 that it expects to break even in the second quarter of 2002 on earnings before interest, taxes, depreciation and amortization. Analysts are at odds over Akamai's future, with many concerned that the content delivery market will take years to pay off. Others are bullish on the company's long-term potential.

In the here and now, the naysayers appear justified. In that same April announcement, the company lowered its 2001 revenue projections, saying it now expects to earn \$175 million to \$190 million, rather than \$240 million to \$250 million.

Conrades remains confident. Akamai can continue strong growth rates, he says, because he is shifting the company toward enterprise and network customers and away from dot-coms.

Akamai, which Network World in 1999 named one of 10 companies to watch, is still worth keeping an eye on.

— Julie Bort

#### Managing profits

#### These NW200 companies were most profitable

111 2000	•	
2000		Profit as %
rank	Company	of revenue
20	Oracle	62%
94	Check Point Software	52%
14	Microsoft	41%
172	Verity	34%
54	Cabletron	32%
10	Intel	31%
65	Tektronix	31%
43	National Semiconductor	29%
27	Alltel	27%
38	ADC Telecommunications	26%
152	Emulex	23%
101	Foundry Networks	23%
80	Symantec	23%
58	Adobe Systems	23%
165	Open Text	22%

#### These NW200 companies showed the biggest profit gains from 1999 to 2000

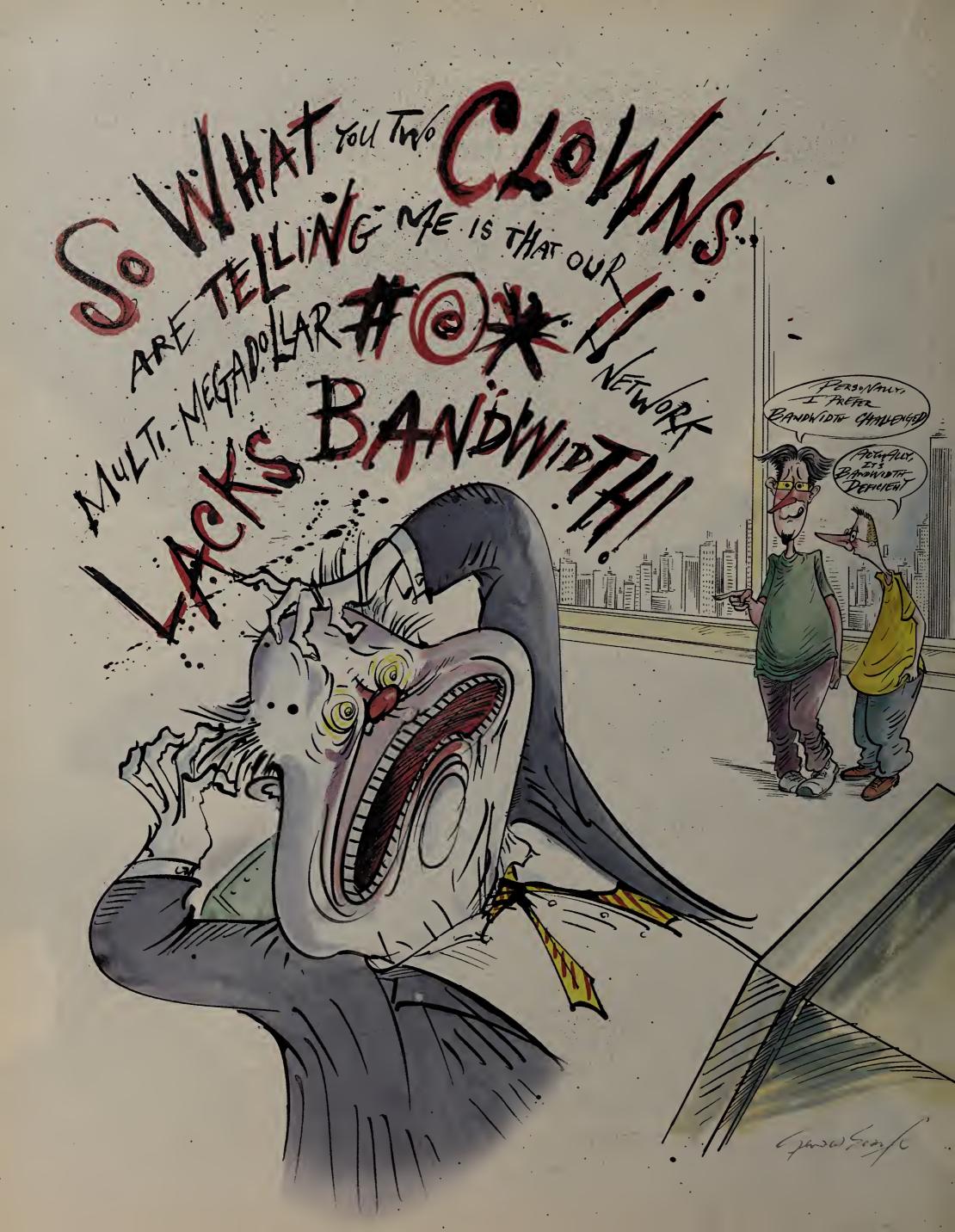
pront	gams nom 1999 to 2000	<b>,</b>
2000		Profit growth
rank	Company	1999-2000
191	SonicWall	5436%
124	Hummingbird	3584%
105	Brocade Communications	2634%
38	ADC Telecommunications	1014%
152	Emulex	523%
168	Proxim	425%
20	Oracle	388%
101	Foundry Networks	285%
80	Symantec	239%
39	Qualcomm	234%
195	Webtrends	226%
138	Computer Network Technolog	y 189%
172	Verity	172%
15	EDS	172%
68	Andrew	162%

#### These NW200 companies gained the most

2000 ank	Company	Profit 1995-200 CAGR*
47	Siebel Systems	271%
26	Hughes Electronics	165%
195	Webtrends	121%
89	Citrix Systems	119%
94	Check Point Software	114%
179	NetScout Systems	91%
2	AT&T	86%
39	Qualcomm	86%
59	Comverse Technology	73%
7	WorldCom	72%
20	Oracle	70%
38	ADC Telecommunications	69%
13	Dell	62%
121	McData	62%
110	Avocent	57%

\*Compound annual growth rate







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Hubs with OC 192 Switches*	8	3	0	0
Monitoring/ Performance	Real-Time at: http://www.qwest.com	www.uu.net	Limited customer level only	Real-Time
Bandwidths	56Kbps to OC 48	56Kbps to OC 12	56Kbps to OC 12	56Kbps to OC 12
Cisco® Powered Network (Domestic)	Yes	No	Yes	No

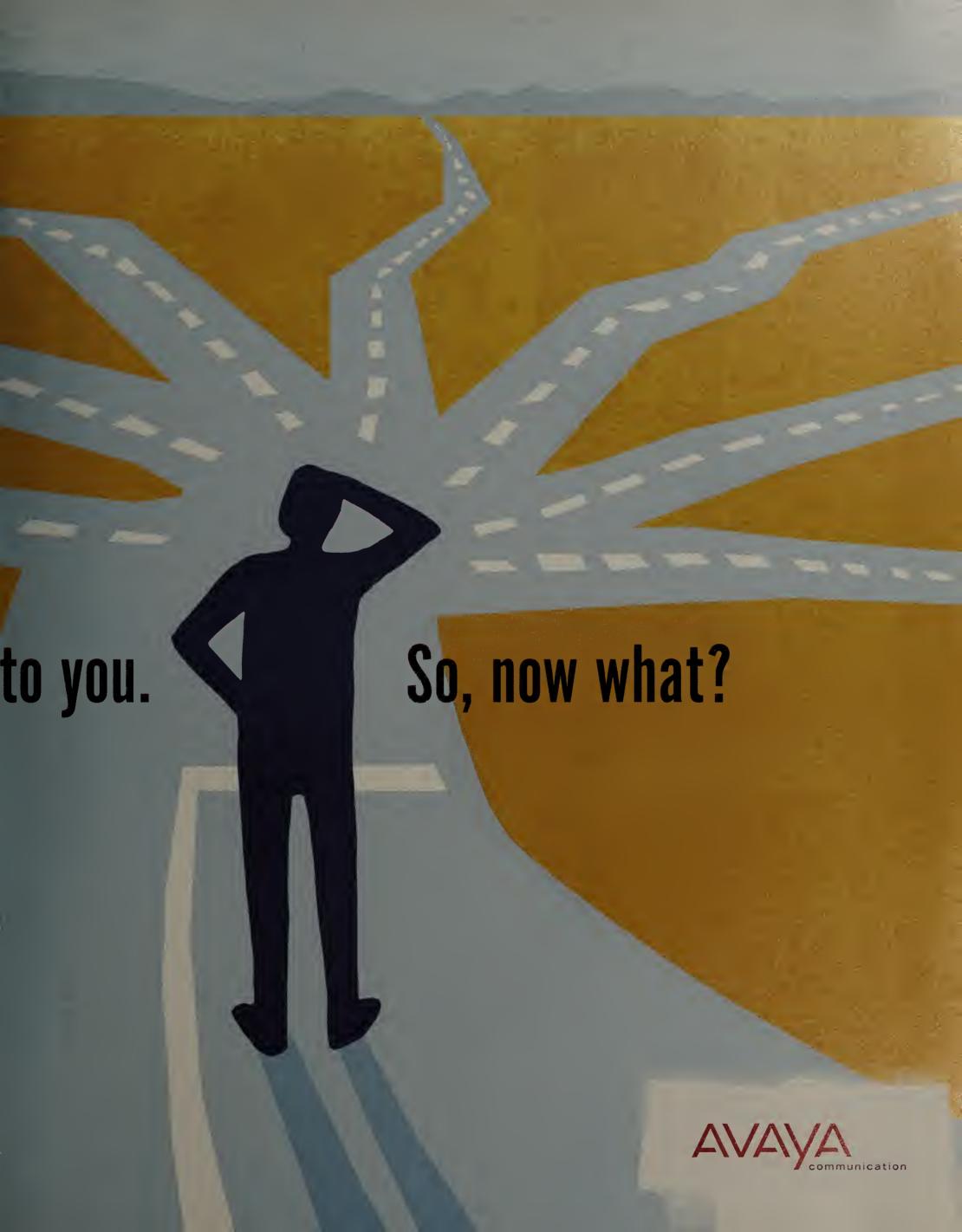
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			2000 re	venue			<b>2000</b> pro	ofit/loss				Mkt. cap.	Cash and		Number of	employe	es	Rev. per
Ran' 2000	1999	Company	SM	'99-'00 % ∆	'95-'00 CAGR	Int'l %	\$M	'99-'00 % ∆	% of rev.	Profit rank	'95-'00 CAGR	\$M 3/9/01	invest SM	Stock symbol	2000	'99-'00 % ∆	'95-'00 CAGR	emp. 2000
1	1	IBM	88,396	1%	4%	48%	8,093	5%	9%	4	14%	174,190	3,722	IBM	316,303	0%	-12%	2000
2	2	AT&T	65,981	5%	-4%	0%	3,105	-43%	5%	10	86%	88,620	126	T	160,000	8%	-12%	\$412,381
3	8	Verizon	64,707	11%	38%	3%	11,797	43%	18%	1	45%	128,990	2,370	VZ	263,552	81%	34%	
4	3	SBC Communications	51,476 48,782	4% 15%	32%	79% 56%	7,967	-2% 6%	15% 8%	5 9	0% 13%	152,320 58,770	4,007	SBC	220,090	8% 5%	30%	\$233,886 \$551,209
5	6	Hewlett-Packard Compaq	42,383	10%	23%	52%	3,697 569	0%	1%	30	-6%	31,450	2,569	CPQ	88,500 70,100	4%	33%	\$604,608
7	7	WorldCom	39,090	9%	61%	15%	4,088	4%	10%	8	72%	48,760	761	WCOM	77,000	0%	59%	\$507,662
8	9	Motorola	37,580	14%	7%	0%	1,318	48%	4%	17	-6%	33,970	3,955	MOT	147,000	21%	1%	\$255,646
9	5	Lucent	33,813	10%	10%	34%	1,219	-75%	4%	19	0%	42,000	1,467	LU	126,000	-18%	0%	\$268,357
10	10	Intel	33,726	15%	16%	59%	10,535	44%	31%	2	24%	197,820	13,823	INTC	86,100	23%	16%	40000
11 12	13	Nortel Networks  BellSouth	30,275	42%	23% 8%	35%	(3,470) 4,220	22%	16%	199 7	0%	54,700 77,710	1,640	NT BLS	94,500	23% 8%	8% 3%	\$320,370
13	16	Dell	25,265	38%	49%	33%	1,666	14%	7%	16	62%	60,470	4,132	DELL	36,500	50%	42%	\$251,650 \$692,192
14	14	Microsoft	22,956	16%	31%	32%	9,421	21%	41%	3	45%	302,450	23,798	MSFT	39,100	24%	17%	\$587,110
15	15	EDS	19,227	3%	9%	42%	1,143	172%	6%	20	4%	29,320	693	EDS	121,000	0%	5%	\$158,899
16	37	Qwest Communications	18,954	14%	173%	0%	995	54%	5%	21	0%	55,980	154	Q	65,000	550%	0%	\$291,600
17	19	Cisco	18,928	55%	57%	0%	2,668	32%	14%	11	45%	148,580	5,525	CSC0	34,000	62%	53%	\$556,706
18	20	Sprint Sun	17,688 15,721	3%	7% 22%	0% 47%	1,964 1,854	25% 80%	11%	12 14	38% 39%	19,260 56,840	2,475	FON SUNW	81,000 38,900	<u>4%</u> 34%	11% 22%	\$218,370 \$404,139
20	21	Oracle	10,130	15%	28%	48%	6,297	388%	62%	6	70%	91,470	7,762	ORCL	41,320	-6%	20%	\$245,163
21	22	Gateway	9,653	8%	21%	14%	316	-26%	3%	35	13%	5,120	484	GTW	24,000	14%	21%	\$402,214
22	23	Computer Sciences	9,371	16%	23%	37%	403	13%	4%	32	29%	9,360	260	CSC	61,000	22%	13%	\$153,618
23	26	EMC	8,873	32%	36%	39%	1,782	51%	20%	15	40%	75,160	2,657	EMC	23,400	32%	42%	\$379,180
24	29	Apple	7,983	30%	-6%	48%	786	31%	10%	24	13%	7,010	4,027	AAPL	8,568	23%	-8%	\$931,723
25 26	31	Avaya  Hughes Electronics	7,680	-7% 31%	18%	21%	(375)	0%	11%	180 23	165%	4,025 20,028	271 1,508	AV GMH	31,000	-9%		\$247,742
27	27	Alltel	7,078	10%	18%	2%	1,929	146%	27%	13	40%	17,030	67	AT	27,257	12%	11%	\$259,692
28	34	AOL Time Warner	6,886	43%	77%	0%	1,232	63%	18%	18	0%	182,960	3,415	AOL	15,000	24%	43%	\$459,067
29	24	Unisys	6,885	-9%	2%	58%	225	-56%	3%	40	0%	4,910	378	UIS	36,900	3%	0%	\$186,585
30	32	Computer Associates	6,103	31%	18%	34%	696	11%	11%	26	10%	15,280	1,307	CA	21,000	43%	23%	\$290,619
31 32	28	NCR Nextel Communications	5,959	-4% 51%	-6% 102%	59% 6%	(1,024)	-47%	3%	44 193	0%	4,460 16,046	357	NCR	32,900	2%	-3% 39%	\$181,125
33	30	3Com	5,714 4,334	-17%	27%	51%	(1,024)	67%	16%	27	40%	2,300	4,674 3,070	NXTL COMS	14,000 10,597	-7% -16%	28%	\$408,143 \$408,978
34	39	Lexmark International	3,807	10%	12%	56%	285	-10%	7%	37	55%	6,010	69	LXK	13,035	19%	12%	\$292,060
35		Global Crossing	3,789	154%	0%	0%	(1,980)			196		14,436		GX				
36	42	Anixter International	3,514	30%	10%	22%	79	-37%	2%	57	15%	855	21	AXE	5,000	-4%	0%	\$702,880
37	44	Tellabs	3,387	46%	40%	22%	731	33%	22%	25	45%	18,679	1,022	TLAB	8,600	23%	25%	\$393,888
38 39	46 36	ADC Telecommunications Qualcomm	3,288	53% -19%	35% 0%	22% 47%	868 670	1014% 234%	26%	22 28	69% 86%	8,340 39,130	1,354 717	ADCT QCOM	22,452 6,300	57% -35%	43% 15%	\$146,441 \$507,425
40	40	CompuCom Systems	2,711	-8%	13%	0%	5	-56%	0%	101	-24%	115	15	CMPC	4,116	-18%	9%	\$658,561
41	41	Silicon Graphics	2,331	-15%	1%	44%	(830)			187		913	258	SGI	6,726	-27%	1%	\$346,585
42	48	CompuWare	2,231	36%	33%	22%	352	1%	16%	33	41%	3,490	188	CPWR	15,356	41%	30%	\$145,261
43	45	National Semiconductor	2,140	9%	-2%	64%	621	0%	29%	29	19%	4,060	850	NSM	10,500	-9%	-14%	\$203,800
44 45	43	Storage Technology  Broadwing Communications	2,060 2,050	-13% 86%	1% 9%	49% 0%	(2)			112 182		1,130 4,971	280 38	STK BRW	7,627	-12% 0%	-5% -17%	\$270,120
46		Harris	1,807	4%	-12%	27%	18	-66%	1%	85	-35%	1,592	378	HRS	6,000 10,500	0%	-17%	\$341,683 \$172,133
47	70	Siebel Systems	1,795	121%	195%	26%	222	102%	12%	41	271%	12,080	1,153	SEBL	7,389	131%	135%	\$242,981
48	50	PeopleSoft	1,736	22%	50%	26%	146	0%	8%	50	40%	6,150	1,001	PSFT	8,000	15%	43%	\$217,059
49	53	BMC Software	1,719	32%	38%	36%	243	-33%	14%	39	26%	5,730	152	BMCS	6,677	36%	41%	\$257,481
50 51	55 49	Scientific-Atlanta	1,715 1,661	38% 15%	8%	21% 0%	156	52%	9%	48	20% 34%	7,960	523	SFA	10,227	57%	17%	\$167,733
52	49	SunGard Data Systems  Micron Electronics	1,556	8%	26% 9%	20%	213 42	154% 14%	13% 3%	43 70	-9%	7,510 356	436 326	SDS MUEI	3,276	26%	11%	\$475,035
53	52	American Power Conversion	1,484	10%	24%	0%	166	-20%	11%	47	19%	2,640	308	APCC	7,350	24%	26%	\$201,845
54	51	Cabletron	1,460	3%	12%	35%	464	0%	32%	31	23%	2,390	573	CS	4,456	-25%	-2%	\$327,557
55	59	Symbol Technologies	1,450	27%	21%	0%	(69)			154		6,940	63	SBL				
<u>56</u>	62	Quantum - DLT & Storage Group	1,419	9%	117%	36%	146	18%	10%	51	0%	2,018	337	DSS	2,300	18%	0%	\$616,900
57 58	62	McLeodUSA Adobe Systems	1,397 1,266	54% 25%	117% 11%	<u>0%</u> 0%	(532) 288	21%	23%	183 36	25%	7,740 6,490	1,555 680	MCLD ADBE	10,700 2,745	<u>40%</u> -1%	91% 3%	\$130,533 \$461,340
59	73	Comverse Technology	1,225	35%	53%	0%	264	51%	22%	38	73%	12,580	1,736	CMVT	2,140	1 /0	370	Ψ <del>7</del> 01,340
60	72	Veritas Software	1,207	103%	119%	0%	(620)			184		22,740	1,119	VRTS	4,784	406%	123%	\$252,368
61	81	Level 3 Communications	1,185	130%	0%	0%	(1,455)			195		8,050	1,269	LVLT	5,900	53%	0%	\$200,847
62	54	Novell	1,162	-9%	-11%		49	-74%	4%		-32%	1,930	698	NOVL	4,893	-13%	-8%	
63 64	67	Genuity  Belden	1,137 1,135	61% 39%	87% 13%	5% 32%	(947)	47%	5%	190 67	120/	2,800 571	860	GENU	3,557	11%	1.00/	\$319,561
65	47	Tektronix	1,135	-1%		47%	53 349	0%	31%	67 34	12% 34%	571 2,500	<i>1</i> 784	BWC TEK	6,000 4,276	<u>11%</u> -44%	10% -11%	\$189,223 \$262,057
66	57	Perot Systems	1,106	-4%		27%	56	-26%	5%		43%	1,200	240	PER	7,500	7%	26%	\$147,453
67		Palm	1,058	88%		35%	46	55%	4%		0%	11,117	1,062	PALM	951	50%	0%	\$1.1 M

R&D			Fiscal					
% rev.	% rev.	Year	year	Web				
1999	2000	inc.	ends	address	Chair	CEO	President	Products and services
6%	6%	1911	Dec	ibm	Louis Gerstner	Louis Gerstner	Samuel Palmisano	Computer hardware
		_1877	Dec	att	C. Michael Armstrong	C. Michael Armstrong	David Dorman	Communications services
		1935	Dec	verizon	Charles Lee	Charles Lee; Ivan Seidenberg	Ivan Seidenberg	Communications services
		1984	Dec	sbc	Edward Whitacre	Edward Whitacre	Royce Caldwell	Communications services
6%	5%	1939	Oct	hp	Carly Fiorina	Carly Fiorina	Carly Fiorina	Computer hardware and software
4%	3%	1982	Dec	compaq	Michael Capellas	Michael Capellas	Michael Capellas	Computer hardware and software
		1968	Dec	wcom	Bert Roberts	Bernie Ebbers	Bernie Ebbers	Communications services
11%	12%	1928	Dec		Christopher Galvin		Robert Growney	Telecommunications equipment
				mot		Christopher Galvin	Robert Glowney	
11%	16%	1995	Sep	lucent	Henry Schacht	Henry Schacht	0 1 P "	Telecommunications equipment
12%	12%	1968	Dec	intel	Andrew Grove	Craig Barrett	Craig Barrett	Semiconductors and microprocessors
15%	18%	1880	Dec	nortel	Frank Carlucci	John Roth	John Roth	Telecommunications and networking equipment and services
	· · · · · · · · · · · · · · · · · · ·	1984	Dec	bellsouth	F. Duane Ackerman	F. Duane Ackerman	F. Duane Ackerman	Communications services
1%	2%	1984	Jan	dell	Michael Dell	Michael Dell		Computer hardware
15%	16%	1975	Jun	microsoft	Bill Gates	Steven Ballmer	Steven Ballmer	Computer software and services
		1962	Dec	eds	Richard Brown	Richard Brown	Jeffrey Miller	Computer software and services
		1984	Dec	qwest	Joseph Nacchio	Joseph Nacchio		Communications services
14%	14%	1984	Jul	cisco	John Morgridge	John Chambers	John Chambers	Networking and communication devices
1470	0%	1899	Dec		William Esrey		Ronald LeMay	Telecommunications services
4.10/		_		sprint	<del></del>	William Esrey	-	
11%	10%	1982	Jun	sun	Scott McNealy	Scott McNealy	Edward Zander	Computer hardware
10%	10%	1977	May	oracle	Larry Ellison	Larry Ellison		Database and file-management software
		1985	Dec	gateway	Ted Waitt	Ted Waitt		Personal computers
		1959	Mar	CSC	Van Honeycutt	Van Honeycutt	Van Honeycutt	IT services
9%	9%	1979	Dec	emc	Michael Ruettgers	Joseph Tucci	.loseph Tucci	Data storage devices
5%	5%	1977	Sep	apple		Steven Jobs		Computer hardware
7%	6%	2000	Sep	avaya	Patricia Russo	Donald Peterson	Donald Peterson	Communication systems and software
		1932	Dec	hughes	Michael Smith	Michael Smith		Satellite and wireless communications
		1983	Dec	alltel	Joe Ford	Joe Ford	Scott Ford	Wireless communications services
CW	40/						Scott Fold	
6%	4%	1985	Jun	aol .	Stephen Case	Gerald Levin		ISP
4%	5%	1986	Dec	unisys	Lawrence Weinbach	Lawrence Weinbach	Lawrence Weinbach	Information systems
9%	22%	1976	Mar	ca	Charles Wang	Sanjay Kumar	Sanjay Kumar	Integrated computer software services
6%	6%	1884	Dec	ncr	Lars Nyberg	Lars Nyberg	Lars Nyberg	Relationship technology services
		1987	Dec	nextei	Daniel Akerson	Timothy Donahue	Timothy Donahue	Wireless communications
11%	14%	1979	Jun	3com	Eric Benhamou	Bruce Claflin	Bruce Claflin	Networking products and services
5%	6%	1991	Dec	lexmark	Paul Curlander	Paul Curlander		Computer peripherals
		1997	Dec	globalcrossing	Gary Winnick, Lodwrick Cook	Thomas Casey	David Walsh	Voice, data and Internet services
	_	1957	Dec	anixter	Samuel Zell	Robert Grubbs	Robert Grubbs	Networking and cabling services
1 20/	12%							
13%		1975	Dec	tellabs	Michael Birck	Michael Birck	Michael Birck	Data, voice, video transport and network access systems
12%	10%	1935	Oct	adc	William Cadogan	William Cadogan	William Cadogan	Network equipment, software and integration services
10%	11%	1985	Sep	qualcomm	Irwin Jacobs	Irwin Jacobs	Richard Sulpizio	Wireless communications
	_	1987	Dec	compucom	Harry Wailaesa	Edward Coleman		Technology management services
14%	13%	1982	Jun	sgi	Robert Bishop	Robert Bishop		Computing and visualization products and services
4%	4%	1973	Mar	compuware	Peter Karmanos	Peter Karmanos	Joseph Nathan	Application development software and services
24%	18%	1959	May	national	Brian Halla	Brian Halla	Brian Halla	Semiconductors and microprocessors
12%	13%	1969	Dec	stortek	Patrick Martin	Patrick Martin	Patrick Martin	Storage products
		1873	Dec	broadwing	James Kiggen	Richard Ellenberger	Richard Ellenberger	Communications services
34%	32%	1895		harris	Phillip Farmer		Phillip Farmer	Communications equipment
			Jun		Thomas Siebel	Phillip Farmer Thomas Sighal		
10%	8%	1993	Dec	siebel		Thomas Siebel	Paul Wahl	E-business applications
21%	18%	1987	Dec	peoplesoft .	David Duffield	Craig Conway	Craig Conway	Enterprise application software
14%	17%	1980	Mar	bmc	Max Watson	Robert Beauchamp	Robert Beauchamp	Systems management services
9%	7%	1951	Jun	sciatl	James McDonald	James McDonald	James McDonald	Broadband networks and content distribution networks
9%	9%	1982	Dec	sungard	James Mann	James Mann	Cristobal Conde	Integrated software and services for the financial industry
		1989	Aug	micronpc	Joel Kocher	Joel Kocher	Joel Kocher	Personal computers and electronics
3%	3%	1981	Dec	apcc	Roger Dowdell	Roger Dowdell	Roger Dowdell	Power protection and management for hardware and software
15%	13%	1983	Feb	cabletron	Piyush Patel	Piyush Patel	Piyush Patel	Networking and communication devices
7%	6%	1975	Dec	symbol	Jerome Swartz	Tomo Razmilovic	Tomo Razmilovic	Scanner-integrated wireless data management systems
14%	11%	1980	Mar		Michael Brown		Michael Brown (acting)	Storage devices
14/0	1170			quantum		Michael Brown		
0.00	4.004	1991	Dec	mcleodusa	Clark McLeod	Clark McLeod, Stephen Gray	Stephen Gray	Regional communications services
20%	19%	1982	Dec .	adobe	J. Warnock, C. Geschke	Bruce Chizen	Bruce Chizen	Publishing and imaging software for the Web and print media
19%	19%	1984	Jan	comverse	Kobi Alexander	Kobi Alexander	Itsik Danziger	Computer and telecommunications systems and software
33%	15%	1989	Dec	veritas	Mark Leslie	Gary Bloom	Gary Bloom	Storage management software
		1985	Dec	level3	Walter Scott	James Crowe	James Crowe	Computer operations outsourcing and system integration services
		1000	Oct	novell	Eric Schmidt	Eric Schmidt		Network services software
18%	20%	1983						
18%	20%	2000	Dec	genuity	Paul Gudonis	Paul Gudonis	Joseph Farina	E-business network provider
		2000				Paul Gudonis  C. Baker Cunningham		
1%	1%	2000 1902	Dec	belden	C. Baker Cunningham	C. Baker Cunningham	C. Baker Cunningham	Wire, cable and fiber optics products
		2000 1902 1946	Dec May	belden tektronix	C. Baker Cunningham Jerome Meyer	C. Baker Cunningham Richard Wills	C. Baker Cunningham Richard Wills	Wire, cable and fiber optics products  Test, measurement, and monitoring products and services
1%	1%	2000 1902	Dec	belden	C. Baker Cunningham	C. Baker Cunningham	C. Baker Cunningham	Wire, cable and fiber optics products





			2000 re	venue			2000 profit/loss				Mkt. cap.		Cash and		Number of employees		Dan -	
2 माने				'99-'00	'95-'00	Int'l	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	'99-'00	% of	Profit	'95-'00	SM	invest	Stock		'99-'00	<b>'95-'00</b>	Rev. per emp.
2900	1999	Сопрану	\$M	% Δ	CAGR	%	\$M	% Δ	rev.	rank	CAGR	3/9/01	SM	symbol	2000	% <b>\Delta</b>	CAGR	2000
68	69	Andrew	1,019	29%	10%	44%	80	162%	8%	56	3%	1,290	45	ANDW	5,800	27%	12%	\$175,720
69	61	I.D. Edwards	1,001	6%	24%	35%	(15)			126		1,100	230	JDEC	5,072	-11%	17%	\$197,371
70	76	EarthLink	987	47%	219%	0%	(346)			179		1,280	675	ELNK	7,377	53%	81%	\$133,744
71	65	Sybase	960	10%	0%	39%	72	15%	8%	59	0%	1,520	314	SYBS	4,652	12%	-5%	\$206,461
72	71	Commscope	950	27%	0%	24%	85	25%	9%	54	0%	920	8	CTV	4,000	33%	0%	\$237,507
73	56	Informix	929	-11%	6%	51%	(99)			163		1,890		IFMX	2,300	-37%	-7%	\$404,052
74	64	Mitel	897	7%	19%	40%	36	114%	4%	73	12%	1,050		MLT	5,740	-8%	10%	\$156,296
75	, -	Ciena	859	78%	0%	0%	81	0%	9%	55	0%	19,481	143		2,775	44%	0%	\$309,459
76		Williams Communications Group	839	40%	0500/	00/	(823)	<del></del>		186		6,743	298	WCG	4,360	44%		\$192,449
77	105	Exodus Communications	818	238%	258%	0%	(256)	00/	040/	176	120/	6,920	805	EXDS	0.540	4.00/	00/	¢200 04 4
78	74	Adaptec	811	17%	12%	50%	(1.002)	0%	21%	45	13%	1,110	181	ADPT	2,512	18%	8%	\$322,914
79	86	Winstar Communications	759 746	70%	97%	0% 45%	(1,002)	239%	23%	191 46	43%	3,370		SYMC	4,400 2,600	13% 8%	91%	\$172,574 \$286,817
80	79 75	Symantec  Network Associates	746	9%	53%	37%	(103)	23970	23%	164	4370	1,020	694	NETA	2,800	4%	62%	\$266,319
81 82	15	XO Communications	724	164%	149%	0%	(1,101)			194		5,120		XOXO	7,400	111%	106%	\$97,814
83		Juniper Networks	674	556%	14370	35%	148	0%	22%	49		17,426	1,145	JNPR	927	177%	100%	\$726,538
84	87	Excite@Home	616	47%	0%	5%	(7,440)	070	22 70	200		2,135		ATHM	2,700	16%	183%	\$228,287
85	82	Aspect Communications	591	21%	24%	32%	8	0%	1%	98	-20%	512	171	ASPT	2,500	6%	21%	\$236,208
86	96	Network Appliance	579	100%	108%	31%	74	107%	13%	58	0%	6,780	353	NTAP	1,469	80%	70%	\$394,350
87		Infonet Services	481	59%	0%	74%	(27)			133		2,350	728	IN	859	0%	0%	\$560,470
88	158	VeriSign	475	460%	312%	0%	(3,115)			198		7,980	1,026	VRSN	2,300	484%	145%	\$206,420
89	89	Citrix Systems	470	17%	-50%	0%	95	-19%	20%	52	119%	4,010	467	CTXS	1,400	30%	79%	\$336,033
90	97	BEA Systems	464	61%	257%	40%	(20)			129		11,820	801	BEAS	1,900	58%	0%	\$244,426
91	91	Adtran	463	26%	21%	3%	65	28%	14%	61	17%	1,000	88	ADTN	1,756	37%	19%	\$263,638
92		Acterna	453	38%	-1%	5%	6	-7%	1%	100	-21%	1,720	34	ACTR	4,700	100%	13%	\$96,434
93	85	Ptek Holdings	437	-5%	81%	29%	(59)			150		141	23	PTEK	2,480	1%	80%	\$176,183
94	111	Check Point Software	425	94%	111%	0%	221	131%	52%	42	114%	15,370	438	CHKP	1,000	25%	0%	\$425,283
95	83	Norstan	419	-13%	8%	0%	(69)			155		17	0	NRRD	2,077	-22%	3%	\$201,503
96	143	BroadVision	414	258%	277%	40%	(159)			171		1,640	223	BVSN	2,300	253%	119%	\$179,963
97	94	Inter-Tel	403	28%	22%	0%	(29)			135		239		INTL				
98		Commerce One	402	1,097%	0%	40%	(345)			178		2,120	341	CMRC	3,500	489%	0%	\$114,799
99	92	FileNet	399	15%	12%	28%	39	96%	10%	72	36%	551		FILE	1,800	6%	10%	\$221,452
100	95	Cognos	386	28%	26%	39%	59	1%	15%	64	48%	1,590	197	COGN	2,545	53%	22%	\$151,528
101	133	Foundry Networks	377	182%	00/	30%	88	285%	23%	53		1,290	252	FDRY	572	158%	004	\$659,362
102	116	Prodigy Communications	376	117% 41%	289%	0% 0%	(210)			174 181		246	23 10	PRGY ESPI	475	7% 27%	79%	\$792,326
103	114	e.spire Communications Polycom	331	66%	68%	0%	(375)	75%	16%	66	0%	1,810	206	PLCM	1,800	10%	78% 25%	\$191,222 \$828,255
104 105	168	Brocade Communications	329	379%	0%	22%	68	2634%	21%	60	0%	6,130	155	BRCD	785	331%	0%	\$419,166
106	102	Hypercom	328	19%	18%	53%	(31)	203470	2170	136	0 70	182		HYC	1,814	54%	0%	\$180,573
107	98	MRV Communications	319	11%	52%	0%	(153)			170		815	284		1,000	0%	66%	\$319,394
108	117	Mercury Interactive	307	64%	51%	32%	65	95%	21%	62	0%	3,100	629	MERQ	1,400	63%	36%	\$219,286
109	106	DMC Stratex Networks	301	27%	14%	79%	12	0%	4%	89	44%	641	124	STXN	974	12%	10%	\$308,525
110		Avocent	294	35%	51%	0%	59	47%	20%	63	57%	895	121	AVCT	487	343%	58%	\$603,696
111	107	Remedy	289	26%	48%	0%	34	14%	12%	75	35%	729	208	RMDY				
112	132	InterVoice-Brite	286	109%	30%	45%	(15)			124		299	23	INTV	1,375	90%	17%	\$208,164
113		Copper Mountain Networks	282	150%		0%	- 2	-86%	1%	107		183	163	CMTN	458	91%		\$614,795
114	112	RSA Security	280	28%	44%	33%	39	38%_	14%	71	42%	1,690	335	RSAS	1,100	32%	47%	\$254,719
115		Ariba	279	515%		22%	(793)			185		2,900	280	ARBA	1,680	335%		\$166,095
116		Redback Networks	278	333%	***	0%	(1,008)			192		2,980	434	RBAK	580	112%		\$479,328
117	99	Progress Software	271	-5%	9%	61%	34	4%	12%	74	15%	524	158	PRGS	1,300	-5%	3%	\$208,728
118	149	Extreme Networks	262	167%		45%	20	0%	8%	83		2,040	183	EXTR	680	173%		\$385,229
119	131	Peregrine Systems	253	83%	67%	41%	(25)			131		2,940	34	PRGN	1,433	63%	0%	\$176,762
120	150	Tibco Software	252	161%		0%	(25)			130		1,810	583	TIBX	1,000	104%		\$251,797
121		McData	249	161%	49%	0%	31	0%	12%	78	62%	2,030	366		473	13%	0%	\$525,763
122		Paradyne Networks	248	9%	-1%	0%	(34)			138		65	20		900	5%	0%	\$275,202
123	134	Real Networks	242	84%	166%	0%	(110)			165		1,090	365	RNWK	1,040	60%	0%	\$232,248
124		Hummingbird	237	43%	39%	38%	10	3584%	4%	94	-7%	519	79	HUMC	710	0%	24%	\$333,952
125	110	Legato Systems	231	1%	51%	0%	(35)	4516	440	139		955	151	LGT0	1,200	-5%	48%	\$192,829
126	113	MTI Technology	227	13%	12%	28%	25	151%	11%	79	0%	105		MTIC	686	18%	3%	\$331,045
127	101	Network Equipment Technologies	226	-14%	-4%	28%	(40)			143		106		NWK	843	-32%	-8%	\$267,718
128	165	Inktomi	223	204%	4.004	0%	(9)			121		989		INKT	869	72%		\$257,174
129	109	Exabyte Enjoyr Software	222	15%	-10%	0%	(80)			158		64		EXBT	1,100	8%	-4%	\$202,005
130	103	Epicor Software Sycamore Networks	220	-15%	31%	26%	(41)	004	1.00/	144		62		EPIC	1,400	-14%	0%	\$156,977
131	136	Sycamore Networks  Documentum	198 198	1649% 54%	51%	0% 0%	20	0% 0%	10%	82	A 70/	3,850		SCMR	687	297%	200	\$288,409
132 133	136 142	Internet Security Systems	198	67%	265%	23%	9 18	145%	4% 9%	97 84	47% 0%	540 1,790		DCTM ISSX	893 1,000	35%	39%_ 0%	\$221,262
134	120	Borland Software	193	9%	-6%	55%	21	-9%	11%		0%	481		BORL	800	27% 8%	0%	\$194,975 \$238,834
104_	120	Donard Objevare	191	370	-0/0	JJ 70	21	-970	11/0	01	0 /6	401	203	DONL	000	070	0%	Ψ230,034

R&D			Fiscal					
% rev. 1999	% rev. 2000	Year inc.	year ends	Web address	Chair	CEO	President	Products and services
4%	4%	1947						
			Sep	andrew	Floyd English	Guy Campbell	Guy Campbell	Communications products and systems
14%	12%	1977 1994	Oct	jdedwards earthlink.net	C. Edward McVaney	C. Edward McVaney	C. Edward McVaney	Supply-chain products, software and services
1.60/	14%	1994	Dec		Sky Dayton	Charles Betty	Michael McQuary	Internet services
16%	2%	1953	Dec Dec	sybase	John Chen Frank Drendel	John Chen Frank Drendel	John Chen Brian Garrett	Distributed, open computing services  Broadband video distribution applications
18%	18%	1933	Dec	commscope informix	Frank Drender	Peter Gyenes	Jean-Yves Dexmier	
11%	11%	1971	Mar	mitel	Henry Simon	Kirk Mandy	Kirk Mandy	Information management software and services  Telephone systems and semiconductors
22%	15%	1992	Oct	ciena	Patrick Nettles	Patrick Nettles	Gary Smith	Intelligent optical networking equipment
2270	1370	1998	Dec	williamscommunications	Keith Bailey	Howard Janzen	Howard Janzen	Communications services
4%	2%	1995	Dec	exodus.net	Ellen Hancock	Ellen Hancock	Don Casey	Web hosting services
21%	13%	1981	Mar	adaptec	Laurence Boucher	Robert Stephens	Robert Stephens	Storage products and services
2170	1070	1993	Dec	winstar	William Rouhana	William Rouhana	Nathan Kantor	Broadband services
22%	15%	1982	Mar	symantec	John Thompson	John Thompson	John Thompson	Content and network security services
22%	23%	1989	Dec	nai	Edwin Harper	George Samenuk	George Samenuk	Security and desktop management services, antivirus software
		1994	Dec	XO	Daniel Akerson	Daniel Akerson	Nate Davis	Broadband communications services
40%	15%	1996	Dec	juniper.net	Scott Kriens	Scott Kriens	Scott Kriens	Internet infrastructure services
16%	16%	1995	Dec	home.net	George Bell	George Bell	George Bell	Internet services
17%	17%	1985	Dec	aspect	Beatriz Infante	Beatriz Infante	Beatriz Infante	Customer relationship portals
11%	11%	1992	Apr	netapp	Don Valentine	Daniel Warmenhoven	Thomas Mendoza	Network-attached storage and access devices
		1970	Mar	infonet	Jose Collazo	Jose Collazo	Jose Collazo	Data communications services
16%	20%	1995	Dec	verisign	D. James Bidzos	Stratton Sclavos	Stratton Sclavos	Internet-based trust services
10%	11%	1989	Dec	citrix	Roger Roberts		Mark Templeton	Application server products
15%	13%	1995	Jan	beasys	William Coleman	William Coleman	Alfred Chuang	E-commerce infrastructure software
11%	11%	1985	Dec	adtran	Mark Smith	Mark Smith	Howard Thrailkill	Digital transmission products, DSL products
13%	13%	1959	Mar	acterna	Ned Lautenbauch	Ned Lautenbauch	Ned Lautenbauch	Global communications equipment
3%	3%	1991	Dec	ptek	Boland Jones	Boland Jones	Jeffrey Allred	E-business and communications services
9%	7%	1993	Dec	checkpoint	Gil Shwed	Gil Shwed	Gil Shwed	Internet security products and services
		1973	Apr	norstan	Paul Baszucki	James Granger	James Granger	Telephone and call center systems
13%	12%	1993	Dec	broadvision	Pehong Chen	Pehong Chen	Pehong Chen	Applications software
5%	6%	1969	Dec	inter-tel	Steven Mihaylo	Steven Mihaylo	Steven Mihaylo	Digital telephone systems and call processing software
89%	25%	1994	Dec	commerceone	Mark Hoffman	Mark Hoffman	Robert Kimmitt	Global e-commerce products and services
16%	15%	1982	Dec	filenet	Lee Roberts	Lee Roberts	Ron Ercanbrack	Web-based content management and e-business applications
14%	14%	1969	Feb	cognos	James Tory	Renato Zambonini	Renato Zambonini	E-business intelligence products and services
7%	7%	1996	Dec	foundrynet	Bobby Johnson	Bobby Johnson	Bobby Johnson	Networking products
7%	4%	1984	Dec	prodigy	Charles Foster	Paul Roth	Paul Roth	Internet services
		1993	Dec	espire.net	George Schmitt	George Schmitt (interim)		Facilities-based integrated communications
11%	11%	1990	Dec	Polycom	Robert Hagerty	Robert Hagerty	Robert Hagerty	Media-rich communication tools and network services
22%	15%	1995	Oct	brocade	Seth Neiman	Gregory Reyes	Gregory Reyes	Fibre Channel SAN switches
12%	13%	1978	Dec	hypercom	George Wallner	Christopher Alexander	Christopher Alexander	End-to-end electronic payment services
12%	23%	1988	Dec	mrv	Shlomo Margalit	Noam Lotan	Noam Lotan	Optical networking and Internet infrastructure products
13%	10%	1989	Dec	merc-int	Amnon Landan	Amnon Landan	Amnon Landan	Integrated performance management products and services
10%	8%	1984	Mar	dmcwave	Charles Kissner	Sam Smookler	Sam Smookler	Wireless communications products and services
6%	5%	2000	Dec	avocent	Stephen Thornton	Stephen Thornton	Stephen Thornton	Connectivity products and services
18%	18%	1990	Dec	remedy	Lawrence Garlick	Lawrence Garlick	Lawrence Garlick	CRM and IT service management services
10%	21%	1983	Feb	intervoice	David Brandenburg	David Brandenburg Richard Gilbert	David Berger Richard Gilbert	Call automation systems  DSL products and services
14% 17%	16% 16%	1996 1984	Dec Dec	coppermountain	Richard Gilbert Charles Stuckey	Arthur Coviello	Arthur Coviello	Electronic security products and services
26%	24%	1996	Sep	rsasecurity ariba	Keith Krach	Keith Krach	Larry Mueller	E-business software and network services platform provider
33%	46%	1996	Dec	redbacknetworks	Pierre Lamond	Vivek Ragavan	Vivek Ragavan	Advanced networking systems
13%	14%	1981	Nov	progress	- 1010 Camona	Joseph Alsop	Joseph Alsop	Enterprise-class business software
17%	12%	1996	Jun	extremenetworks	Gordon Stitt	Gordon Stitt	Gordon Stitt	Broadband networking products and services
29%	21%	1981	Mar	peregrine	Stephen Gardner	Stephen Gardner	Gary Lenz	Infrastructure resource management application software
31%	24%	1997	Nov	tibco	Vivek Ranadine	Vivek Ranadine	Vivek Ranadine	E-commerce software
25%	15%	1982	Dec	mcdata	John McDonnell	John McDonnell	John McDonnell	Switches and software for servers and storage systems
16%	16%	1969	Dec	paradyne	Thomas Epley	Sean Belanger	Sean Belanger	Broadband network access products
29%	24%	1994	Dec	realnetworks	Robert Glaser	Robert Glaser		Media delivery and digital distribution services
14%	16%	1984	Sep	hummingbird	Fred Sorkin	Fred Sorkin	Alan Litwin	Enterprise software and services
18%	24%	1988	Dec	legato	Louis Cole	David Wright	David Wright	Enterprise storage management software
6%	7%	1987	Apr	mti	Ray Noorda	Thomas Raimondi	Thomas Raimondi	Networking storage systems
17%	19%	1983	Mar	net	Hans Wolf	Hubert Whyte	Hubert Whyte	Multiservice WANs
41%	27%	1996	Sep	inktomi	David Peterschmidt	David Peterschmidt	David Peterschmidt	Scalable infrastructure software
16%	16%	1985	Dec	exabyte	William Marriner	William Marriner	William Marriner	Data storage devices
12%	12%	1984	Dec	epicor	L. George Klaus	L. George Klaus	Richard Roll	E-business software and services
123%	28%	1998	Jul	sycamorenet	Desh Deshpande	Daniel Smith	Daniel Smith	Software-based optical networking switches
20%	18%	1990	Dec	documentum	Robert Adams	Jeffrey Miller	David DeWalt	Content management platform
18%	16%	1994	Dec	iss.net	Thomas Noonan	Thomas Noonan	Thomas Noonan	Internet security products and services
24%	22%	1983	Dec	borland	William Miller	Dale Fuller	Dale Fuller	Internet-enabling software and services



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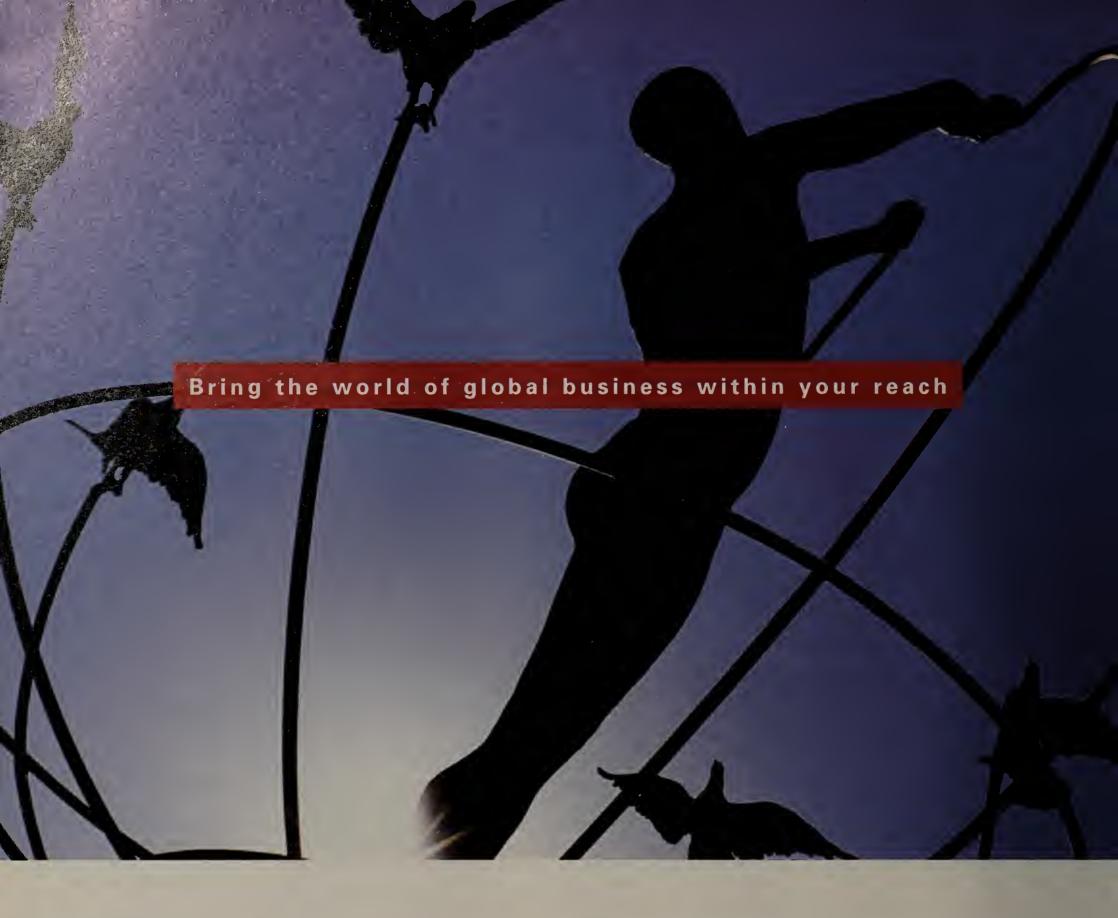
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			2090 ге	venue			2000 pro	fit/loss				Mkt. cap.	Cash and		Number o	f employe	es	Pov. por
Raak				'99-'00	'95-'00	Int'i		<b>'99-'00</b>	% of	Profit	'95-'00	\$M	invest	Stock		'99-'00	'95-'00	Rev. per emp.
2000	1999	Company	SM	% <b>\( \Delta \)</b>	CAGR	%	SM	<b>%</b> Δ	rev.	rank	CAGR	3/9/01	\$M	symbol	2000	% <b>\( \Delta \)</b>	CAGR	2000
135	118	Printronix	190	6%	5%	45%	10	-15%	6%	93	8%	44	15	PTNX	1,017	8%	3%	\$187,060
136	119	Remec	189	6%	27%	18%	(7)			117		397	35	REMC	2,338	23%	26%	\$80,919
137	138	New Era of Networks	188	49%	172%_	36%	(58)			149		239	58	NEON	1,000	3%	0%	\$188,348
138	125	Computer Network Technology	176	40%	17%	0%	12	189%	7%	90	24%	415	39	CMNT				
139		Digex	168	181%		0%	(143)			168		1,040	85	DIGX	1,315	122%		\$127,821
140	12.1	General DataComm	167	-2%	-5%	46%	(37)			141		16		GDC	1,200	7%	-8%	\$139,302
141	165	Quest Software	166	134%	0%	18%	(25)	0.40/		132		1,840	25	QSFT	1,400	114%	0%	\$118,276
142		Rainbow Technologies	163	35%	20%	0%	15	84%	9%	87	9%	149	20		725	22%	22%	\$225,229
143	187	Interliant	158	236%	T 40/	7%	(151)			169		126		INIT	1,340	80%	<del></del>	\$117,963
144	137	SCM Microsystems	158	24%	54%	0%	(5)			115		267	67	SCMM	1.000	2.49/	110/	¢157.407
145	104	Corel	157	-35%	-4%	39%	(55)		20/	147	-28%	150	129	CORL SMSC	1,000	-24% -22%	-13%	\$157,487 \$365,745
146 147	123	Standard Microsystems  Manugistics Group	153 152	-2% -14%	-17% 25%	78% 36%	(9)	0%	3%	120	-20%	256 1,500	75 34	MANU	866	-22% -5%	17%	\$176,020
148		Teligent	152	386%	2570	0%	(850)			188		82	363	TGNT	2,729	-3%	1770	\$55,724
149	108	Santa Cruz Operation	149	-33%	-6%	54%	(57)			148		52	26	SCOC	901	-25%	-4%	\$165,286
150	157	Entrust Technologies	148	74%	0%	31%	(82)			160		528	229	ENTU	1,108	103%	0%	\$133,914
151	129	Brooktrout	142	11%	30%	16%	(8)			119		102		BRKT	461	-2%	38%	\$307,479
152	169	Emulex	140	104%	13%	30%	33	523%	23%	77	53%	1,780	152	EMLX	160	21%	-16%	\$873,575
153		Mercatur Software	138	40%	54%	33%	(98)			162		163		MCTR	750	20%	0%	\$184,387
154	140	Datalink	138	18%	29%	0%	4	-51%	3%	104	10%	76		DTLK	156	16%	0%	\$883,135
155		Vitria Technology	135	327%	0%	20%	(1)			111		617	224	VITR	850	193%	0%	\$158,505
156	126	VTEL	134	-11%	11%	17%	2	0%	2%	105	-9%	27	47	VTEL	592	-4%	5%	\$226,877
157	115	Digi International	133	-32%	-4%	16%	(17)			128		92	39	DGII	509	-15%	-3%	\$260,361
158		Convergent Communications	132	89%	148%	0%	(289)			177		7	56	CONV	1,559	4%	0%	\$84,911
159		Interwoven	132	686%	0%	0%	(32)			137		1,070	222	IWOV	196	-4%	0%	\$674,128
160	179	Micromuse	124	113%		36%	(2)			113		2,660	115	MUSE	514	60%		\$240,337
161	141	Beyond.com	122	2%	161%	0%	(61)			152		13	6	BYND	164	-58%	0%	\$745,439
162	139	Dot Hill Systems	121	-2%		0%	(1)			110		107	34	HIL	434	32%		\$279,256
163		VA Linux Systems	120	579%	156%	0%	(95)			161		179	176	LNUX	515	237%	0%	\$233,584
164		Kana Communications	119	748%		20%	(3,071)			197		226	76	KANA	1,200	256%		\$99,373
165	154	Open Text	113	22%	114%	39%	25	24%	22%	80	0%	499	114	OTEX	739	6%	46%	\$152,835
166		USinternetworking	110	208%		0%	(175)			172		252	57	USIX	1,400	43%		\$78,246
167	4.07	F5 Networks	109	290%	0.704	19%	14	0%	13%	88		142		FFIV	464	148%	0.70/	\$234,149
168	167	Proxim	107	53%	37%	18%	2	425%	2%	106	-5%	528	70		347	33%	27%	\$309,793
169	161	NetManage	104	31%	-4%	30%	(72)			156		78	38	NETM	648	-31%	1%	\$160,605
170	125	Handspring	102	0%	26%	0% 19%	(60)	400/	11%	151 91	1 5 9/	3,020	197	HAND	258	126%	25%	\$395,105
171 172	135 174	AVT Verity	101 96	-23% 49%	26% 43%	7%	11 33	-40% 172%	34%	76	15% 0%	153 707	88 117	AVTC VRTY	488 364	23%	35% 16%	\$206,018 \$264,011
173	155	Davox	94	2%	20%	18%	5	-61%	5%	103	-1%	149	71	DAVX	498	12%	25%	\$189,267
174	172	Concord Communications	91	33%	84%	30%		-82%	1%	108	0%	157	63	CCRD	454	62%	53%	\$201,507
175	192	Netopia	90	104%	10%	18%	(15)	0270	170	125		105	60	NTPA	330	22%	8%	\$273,352
176	102	Akamai Technologies	90	2152%	1070	10%	(886)			189		1,210	150	AKAM	1,300	180%		\$69,051
177	160	Open Market	89	7%	118%	42%	(38)			142		93	30	OMKT	509	10%	15%	\$174,815
178	170	BindView	87	22%	0%	11%	(3)			114		194	59	BVEW	740	27%	0%	\$117,980
179	171	NetScout Systems	86	28%	71%	13%	15	48%	18%	86	91%	193	49	NTCT	249	19%	0%	\$346,020
180		Research in Motion	85	79%	0%	0%	10	64%	12%	92	0%	2,890	0	RIMM	510	75%	0%	\$166,602
181	153	eShare Communications	84	-11%	19%	0%	(11)			122		22	15	ESHR				
182	144	Auspex Systems	82	-28%	-7%	44%	(81)			159		200	29	ASPX	314	-49%	-5%	\$261,780
183		Globix	81	140%	57%	9%	(132)			167		131	374	GBIX	850	89%	76%	\$95,632
184		Silverstream Software	81	249%		0%	(28)			134		227	86	SSSW				
185	199	Applied Theory	76	103%		0%	(53)			146		38		ATHY				
186	176	Active Voice	74	19%	15%	20%	6	0%	8%	99	4%	199	16	ACVC	346	8%	14%	
187		Blue Martini Software	74	561%		19%	(62)			153		243	102	BLUE	473	285%		\$156,979
188		Net2Phone	72	118%		34%	(118)			166		687	58	NTOP	541	62%		\$133,828
189		Tut Systems	72	159%	84%	41%	(74)			157		71	109	TUTS	200	23%	0%	\$359,955
190		InterNap Network Services	70	456%	004	0%	(185)	E4000	1.00	173	004	260	153	INAP	694	132%		\$100,307
191	177	SonicWall  Cylink	69 68	230%	1.4%	33%	(25)	5436%	13%	96	0%	807	220	SNWL	281	285%	7%	\$247,146
192 193	178	Verilink	68	14%	14%	0% 0%	(35)	0.9/	09/	140	110/	73		CYLK	380	-20%		\$179,229
193 194	148	Procom Technology	63	-38%	17% 7%	41%	(8)	0%	U%	109 118	-44%	32 139	11	VRLK PRCM	219	-29% -21%	7% 10%	\$308,954 \$260,123
194	140	Webtrends	61	211%	149%	0%	(8) 9	226%	15%	95	121%	262	26	WEBT	243 400	-21% 145%		
196		Mail.com	61	382%	0%	0%	(230)	22070	13/0	175	121/0	64		MAIL	539	-21%		\$133,175
197		Novatel Wireless	61	540%	0 70	0%	(47)			145		300		NVTL	281	28%	0 /0	\$217,630
198		WatchGuard Technologies	61	194%		55%	(16)			127		227		WGRD	300	82%		\$202,343
199	162	JetForm JetForm	61	16%	259%	34%	(5)			116		51		FORM	549	17%	145%	\$111,111
200		Mobius Management	60	-18%	168%	16%	(12)			123		71		MOBI	423	-3%		\$142,316

R&D			Fiscal					
% rev.	% rev.	Year	year	Web				
1999	2000	inc.	ends	address	Chair	CEO	President	Products and services
10%	10%	1974	Mar	printronix		Robert Kleist	Robert Kleist	Printing products and services
6%	7%	1983	Jan	remec	Ronald Ragland	Ronald Ragland	Errol Ekaireb	High-frequency subsystems
28%	23%	1994 1983	Dec	neonsoft	George Adam	George Adam	Pat Fortune	Internet infrastructure software and services
15% 0%	0%	1999	Jan Dec	cnt	Thomas Hudson  David Ruberg	Thomas Hudson  Mark Shull	Thomas Hudson  Mark Shull	SAN hardware and software
16%	12%	1969	Sep	digex gdc	Charles Johnson	Charles Johnson	Ross Belson	Managed Web hosting services  WAN networking and telecommunications equipment
23%	24%	1987	Dec	quest	Vincent Smith	Vincent Smith	David Doyle	Application and information availability software
9%	7%	1984	Dec	rainbow	Walter Straub	Walter Straub	Walter Straub	Computer network security
		1997	Dec	interliant	L. Fassler, B. Feld	Herb Hribar	Herb Hribar	Hosted applications services
8%	11%	1990	Dec	scmmicro	Steven Humphreys	Robert Schneider	Bernd Meier	Computer hardware
16%	28%	1985	Nov	corel	James Baillie	Derek Burney	Derek Burney	Computer software
11%	16%	1971	Feb	smsc	Steven Bilodeau	Steven Bilodeau	Steven Bilodeau	MOS/VLSI circuits
28%	19%	1969	Feb	manugistics	William Gibson	Gregory Owens	Richard Bergmann	Supply chain products and services
		1996	Dec	teligent	Alex Mandl	Alex Mandi	Alex Mandl	Facilities-based communications company
19%	27%	1979	Sep	SCO SCO	Alok Mohan	Douglas Michels	Douglas Michels	Unix software
19%	39%	1994	Dec	entrust	F. William Conner	John Ryan	John Ryan	Public-key infrastructure products and services
15%	18%	1984	Dec	brooktrout		Eric Giler	Eric Giler	Electronic communications products
17%	11%	1979	Jul	emulex	Fred Cox	Paul Folino	Paul Folino	Fibre Channel host products
15%	15%	1985	Dec	mercatur	James Schadt	Roy King	Roy King	E-business software and services
2%	3%	1958	Dec	datalink	Robert Price	Greg Meland	Greg Meland	Networked data storage products
34%	22%	1994	Dec	vitria	Dishaul Carl	Jo Mei Chang	Jo Mei Chang	E-business infrastructure software
12%	13%	1986	Jul	vtel	Richard Snyder	Stephen Von Rump	Stephen Von Rump	Multimedia visual communication systems
11%	15%	1985	Sep	dgii	Joseph Dunsmore	Joseph Dunsmore	Joseph Dunsmore	Communication adaptors
25%	15%	1995	Dec	converg	Jeffrey Shaw	Joseph Zell  Martin Brauns	Joseph Zell  Martin Brauns	Broadband Internet and Web services
25% 16%	25%	1995 1997	Dec Sep	interwoven	Peng Ong Gregory Brown		Stephen Allott	Web content management software  Software for monitoring technology infrastructures
9%	7%	1994	Dec	micromuse beyond	William McKiernan	Gregory Brown Ronald Smith	Ronald Smith	E-commerce services
6%	7%	1999	Dec	dothill	Charles Christ	James Lambert	James Lambert	Storage and SAN products
18%	18%	1993	Jul	valinux	Onarios Office	Larry Augustin	Ali Jenab	Linux systems and services
91%	42%	1996	Dec	kana	James Wood	James Wood	David Fowler	Internet-architected products and services
16%	16%	1991	Jun	opentext	P. Thomas Jenkins	P. Thomas Jenkins	John Shackleton	Collaborative intranet and extranet services
15%	3%	1998	Dec	usinternetworking	Christopher McCleary	Andrew Stern		Hosted applications services
20%	13%	1996	Sep	F5	Jeffrey Hussey	John McAdam	John McAdam	Internet traffic and content management services
26%	19%	1984	Dec	proxim	David King	David King	David King	High-performance wireless LANs
48%	25%	1990	Dec	netmanage	Zvi Alon	Zvi Alon	Zvi Alon	Internet-based publishing tools
	18%	1998	Jul	handspring	Jeff Hawkins	Donna Dubinsky	Donna Dubinsky	Handheld computers
8%	10%	1982	Dec	avtc	Richard LaPorte	David Anastasi	David Anastasi	Computer telephony products and services
21%	17%	1988	May	verity	Gary Sbona	Gary Sbona	Anthony Bettencourt	Business portal services
14%	17%	1981	Dec	davox	Alphonse Lucchese	David Sample	David Sample	Software and systems integration services
21%	23%	1980	Dec	concord		John Blaeser	John Blaeser	Performance management products and services
30%	24%	1986	Sep	netopia	Reese Jones	Alan Lefkof	Alan Lefkof	DSL equipment
295%	63%	1998	Dec	akamai	George Conrades	George Conrades	Paul Sagan	Content-delivery, streaming media and applications services
27%	28%	1994	Dec	openmarket	Harland LaVigne	Harland LaVigne	Harland Lavigne	E-business services
27%	30%	1990	Dec	bindview	Eric Pulaski	Richard Gardner	Richard Gardner	IT administration and security management services
11% 9%	11% 9%	1984 1984	Mar Feb	netscout rim.net	Anil Singhal  James Balsillic	Anil Singhal  J. Balsillic, M. Lazardidis	Narenta Popat Michael Lazaridis	Corporate network management services  Wireless products and services
15%	13%	1984	Dec	eshare	Aleksander Szlam	Aleksander Szlam	Wildinger Edzariuis	Electronic CRM services
31%	37%	1987	Jun	auspex	AIGNOCHUCE OZIGITI	Alongaridor Ozialii	Michael Worhach	Network file servers
247%	177%	1989	Sep	globix	Marc Bell	Marc Bell	Marc Bell	E-business services
39%	18%	1996	Dec	silverstream	David Skok	David Litwack	David Litwack	E-business platforms
1%	3%	1996	Dec	appliedtheory	Richard Mandelbaum	Danny Stroud	Danny Stroud	E-business services
23%	21%	1983	Mar	activevoice	Robert Richmond	Frank Costa	Frank Costa	Communications equipment
63%	29%	1998	Dec	bluemartini	Monte Zweben	Monte Zweben	Monte Zweben	E-business applications
2%	6%	1996	Jul	net2phone	Clifford Sobel	Howard Balter	Stephen Greenberg	Internet telephony services
37%	25%	1991	Dec	tutsys	Salvatore D'Avria	Salvatore D'Avria	Salvatore D'Avria	High-speed telecommunications services
31%	17%	1997	Dec	internap	Eugene Eidenberg	Anthony Naughton	Anthony Naughton	Centrally managed Internet access services
17%	20%	1991	Dec	sonicwall	Sreekanth Ravi	Sreekanth Ravi	Sreekanth Ravi	Internet security applications
27%	38%	1983	Dec	cylink	Leo Guthart	William Crowell	William Crowell	Network security products
28%	13%	1982	Jun	verilink	Howard Oringer	Graham Pattison	Graham Pattison	Integrated access products
5%	11%	1987	Jul	procom	Alex Razmjoo	Alex Razmjoo	Alex Razmjoo	Network data storage and access appliances
19%	17%	1993	Dec	webtrends	Elijahu Shapira	Elijahu Shapira	W. Glen Boyd	Computer software and services
55%	32%	1994	Dec	mail	Gerald Gorman	Thomas Murawski	Brad Schrader	Global e-mail and messaging services
39%	22%	1996	Dec	novatelwireless	John Major	John Major Christopher Slett	Ambrose Tam	Wireless telecommunications services
35%	23%	1996	Dec	watchguard	Christopher Slatt	Christopher Slatt	Christopher Slatt	Security software and services  Decument management products and services
13%	16%	1982	Apr	jetform	Abraham Ostrovsky Mitchell Gross	Kevin Francis Mitchell Gross	Kevin Francis Mitchell Gross	Document-management products and services  Network and Web access software
14%	25%	1981	Jun	mobius	Mitchell Gross	Mitchell Gross	WITCHEII GIUSS	INCLINION WHEN ACCESS SOFTWATE

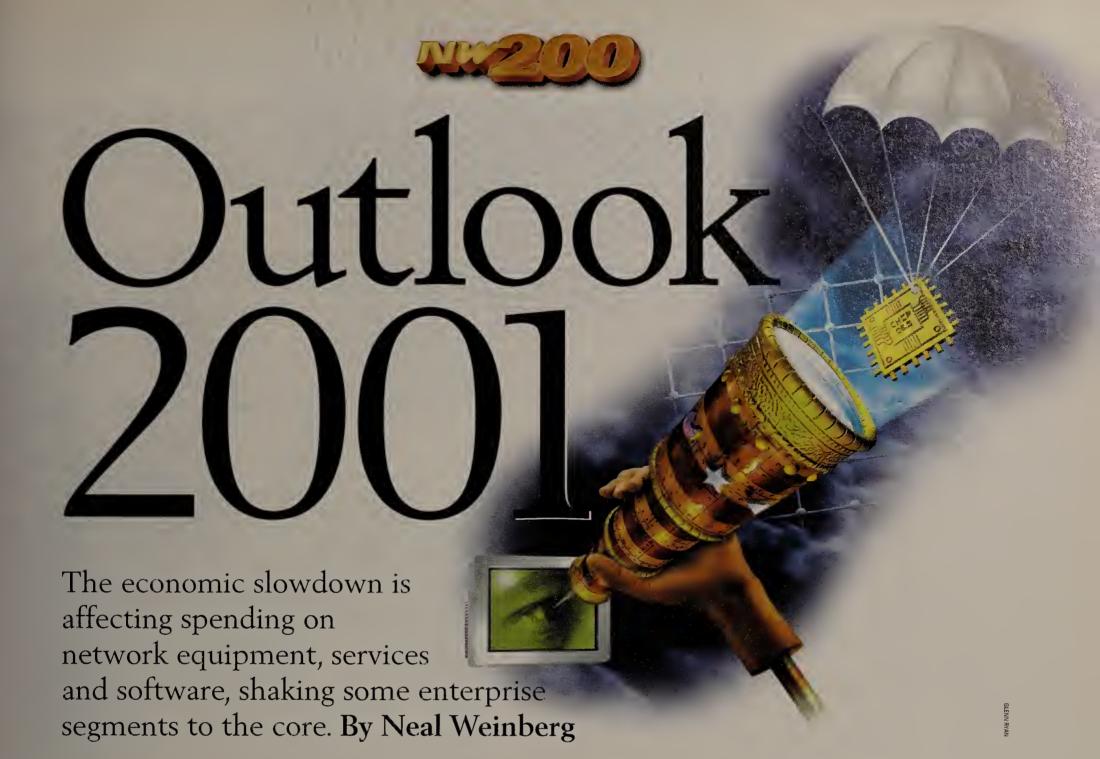


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hen Cisco misses earnings projections and announces layoffs, you know the outlook for other network players can't be good.

Still, the horizon in 2001 is not all doom and gloom. The prognosis varies by sector Here's our annual forecast of how the year will

Still, the horizon in 2001 is not all doom and gloom. The prognosis varies by sector. Here's our annual forecast of how the year will pan out for three critical enterprise segments: carriers and ISPs, infrastructure and enterprise applications.

# **Outlook:** Carriers & ISPs

**▶ CAPSULE:** The prognosis for DSL CLECs, including major players such as Covad and Rhythms, is grim. CLECs with a diversified revenue base, such as XO and Time Warner Telecom, are better-positioned to survive.

No matter what company you work for, just be thankful you're not at a competitive local exchange carrier, especially a data-centric CLEC trying to sell DSL service. And if you're thinking about buying DSL service from a pure-DSL CLEC, you'd be advised to think again.

The list of CLECs filing for bankruptcy is long and getting longer by the day. Members of this not-so-elite group include American MetroCom, Axessa Communications, GST Telecommunications (acquired by Time Warner), ICG Communications and NorthPoint Communications. In fact, stock pickers for some of the major telecom mutual funds have pared the CLECs in their portfolios down to only four or five companies that look like good long-term bets. And those companies have one thing in common: They get revenue from voice, Web hosting and other sources besides DSL.

Venture capital funding, which DSL CLECs need to build out their networks, has dried up. These companies are not profitable and they don't expect to be so until 2003 or 2004. And Wall Street is not in a patient mood. Covad Communications' stock has gone from a high of \$60 per share to less than \$1 per share. Rhythms NetConnections was trading recently at 25 cents per share, down from a high of nearly \$46 per share.

As if the lack of capital weren't a big enough problem, the CLECs now face a full-scale assault by incumbent local exchange carriers (ILEC). Initially, the ILECs resisted the idea of offering DSL themselves because it would cannibalize their profitable T-1 businesses. Their basic strategy was to make it time-consuming and difficult for CLECs to collocate DSL access multiplexer equipment in their central offices.

But more recently, ILECs have decided to take on the CLECs and have engaged them in a DSL price war. Of course, only the ILECs can win that fight. They've got the existing infrastructure to increase DSL sales quickly and the deep pockets to outlast the CLECs.

During 2000, the number of DSL lines deployed by ILECs skyrocketed from 386,000 to 2 million, according to TeleChoice, a market strategy consultancy for the telecommunications industry. TeleChoice predicts that the total number of DSL lines in service will jump to 5.7 million this year, a 142% increase over 2000. And ILECs will account for more than

### CLEC GROWTH

■ Market research firm New Paradigm Resources Group expects CLEC revenue to grow to \$54 billion in 2001, up 40% over last year's total. However, of the \$39 billion in CLEC revenue in 2000, AT&T and WorldCom accounted for \$25 billion.

80% of that total, according to TeleChoice analyst Adam Guglielmo. In fact, SBC Communications and Verizon have more DSL lines in service than one-time leader Covad, whose business is in shambles. As of early January, SBC had 767,000 lines; Verizon, 540,000; and Covad, 274,000. Qwest Communications, with 255,000, and BellSouth, with 215,000, arc catching up quickly, too.

Covad says it expects revenue to reach about \$380 million in 2001, but losses to mount to about \$460 million. It's burning through cash at \$75 million per month, and even though it expects to throttle back spending to \$60 million per month by cutting its payroll through layoffs and focusing on a smaller number of markets, the company only has enough cash to last into early 2002. Those are scary prospects for the once-high-flying company that topped the Network World 200 list of fastest-growing com-



panies just last year (www.nwfusion.com, DocFinder: 3921).

Similarly, Rhythms recently announced layoffs and says it plans to lose \$395 million in 2001. It, too, says it has only enough financing to last for another year.

Another problem for DSL wholesalers such as Covad is that some of their customers, DSL retailers, are going bankrupt themselves. Covad announced recently that it wasn't receiving revenue from 92,000 lines, almost 34% of its 274,000 lines in service because it had wholesaled those lines to 19 "troubled" ISPs. At least four of those — FastPoint, Flashcom, Relay Point and Zyan — have filed for bankruptcy.

Some analysts believe ILECs, primarily Qwest, SBC and Verizon, will simply use their size to crush the majority of CLECs. During this shakeout, a rash of activity is likely, with weak players going under or being bought out, either by stronger CLECs that want to expand their reach or by non-CLECs that want to enter the market.

# CARRIER GRADES

Morningstar.com, which provides research for investors, regularly grades companies on various criteria, including profitability and financial health. Here's a look at the grades of some carriers on the Network World 200, our ranking of the biggest companies in networking by revenue.

NW200			
rank	Carrier	Profitability	Financial health
2	AT&T	A-	В
3	Verizon	B+	A
4	SBC Communications	A	Α
7	WorldCom	С	С
12	BellSouth	A	A-
16	Qwest Communications	C-	D
18	Sprint	A	A
27	Alltel	A	В
35	Global Crossing	D	C
61	Level 3 Communications	В	В
63	Genuity	D-	F
76	Williams Communications Group	D	F
77	Exodus Communications	D+	F
79	Winstar Communications	D-	Not available
82	XO Communications	D-	D-
84	Excite@Home	D	С

Grades reflect the companies' standings as of March 31. Morningstar.com notes they are not meant as an official statement on the health of any individual company, or a recommendation on which stock to buy or which company with whom to do business .

When GST of Vancouver, Wash., went under, Time Warner bought its assets at auction (360,000 access lines, 4,200 miles of fiber optics and 15 voice switches) and created Time Warner Telecom. Allegiance Telecom, a CLEC in Dallas, recently bought InterAccess of Chicago. And AT&T last month bought NorthPoint's assets, including points of presence in 109 cities and towns, at a bankruptcy auction for \$135 million.

Analysts have identified a handful of CLECs that have strong enough management teams and enough capital to survive until the economy picks up. That list includes Allegiance Telecom, which also recently bought Web hosting firm HarvardNet; McLeodUSA; Time Warner Telecom; and XO Communications. These companies all derive revenue from voice traffic, VPN and Web hosting, in addition to DSL.

Another storm cloud has appeared on the CLEC horizon in the form of Michael Powell, the new Federal Communications Commission head. Under the Clinton administration, the FCC would not let ILECs into the long-distance market until they demonstrated that competition existed in the local market. ILECs were, in effect, forced to play ball with the CLECs. Powell has indicated that he would look favorably on ILECs entering long-distance markets without having to first prove local-loop competition.

"If the FCC does not provide regulatory pressure on the traditional market providers, that could be the final nail in the coffin [for CLECs]," says Robert Rosenberg, an analyst at Insight Research, a market research firm for the telecommunications industry.

The FCC's new stance could shift the balance of power in the carrier market against traditional long-distance voice carriers in favor of powerful ILECs such as SBC and Verizon, Rosenberg says. If ILECs get ready access to long-distance, they'd quickly become formidable competitors to AT&T, Sprint and WorldCom with their local/long-distance combos.

Even without competition from the ILECs, the long-distance carriers are in trouble. Price wars have squeezed the profits out of long-distance voice, an already slow-growth market.

AT&T says it expects flat revenue from business long-distance in 2001, while margins will shrink as a result of continued price pressure. And, the company says, consumer long-distance revenue will drop nearly 20%, also with shrinking margins. Based on those factors, as well as the economic downturn, Morgan Stanley Dean Witter predicts AT&T's earnings from its business and consumer long-distance divisions will drop roughly 26% in 2001 compared with 2000. AT&T won't comment on the forecast, but has acknowledged that it needs to show strong growth in Web hosting, Internet access, frame relay, wireless and cable.

The situation at WorldCom isn't much better. WorldCom predicts that revenue from its voice-centric MCI group will fall 2% in 2001, while its data-centric WorldCom group will grow 12% to 15%. WorldCom's strategy is to use the cash that the consumer voice business generates to finance data and Internet investments.

Insight Research predicts that total long-distance minutes will increase only 2.5% in 2001. And Rosenberg says telecom won't bounce back "until we see a continued uptick in consumer confidence," and nobody can predict when that will occur.

Of course, this is all bad news if you're holding AT&T or WorldCom stock. But if you're negotiating a new contract for voice, data or Internet services, you could find some excellent deals out there.

# Outlook: Infrastructure

**♦ CAPSULE:** The slowdown among service providers, and the economy generally, is hurting all infrastructure vendors. Cisco and Nortel are well-positioned to weather the storm; Lucent and 3Com face serious challenges.

The shakeout in the CLEC market and overall slowdown in service provider spending is having far-reaching ramifications. Take the case of a small CLEC named Digital Broadband Communications and its dealings with Cisco.

In February 2000, Digital Broadband announced it was buying \$20 million worth of Cisco optical gear to build out its network. But the firm was more than just another Cisco customer; it was a recipient of Cisco's largess, having previously secured an \$85 million loan to buy switches and routers from the vendor. So when Digital Broadband went belly up several months later, Cisco not only lost a potential customer, but also its loan.

The failure of CLECs, compounded by the downturn in service provider spending, is a major reason Cisco expects 2001 to be a difficult year. In fact, Cisco's sales to CLECs in its latest quarter dropped 40% year over year to \$300 million.

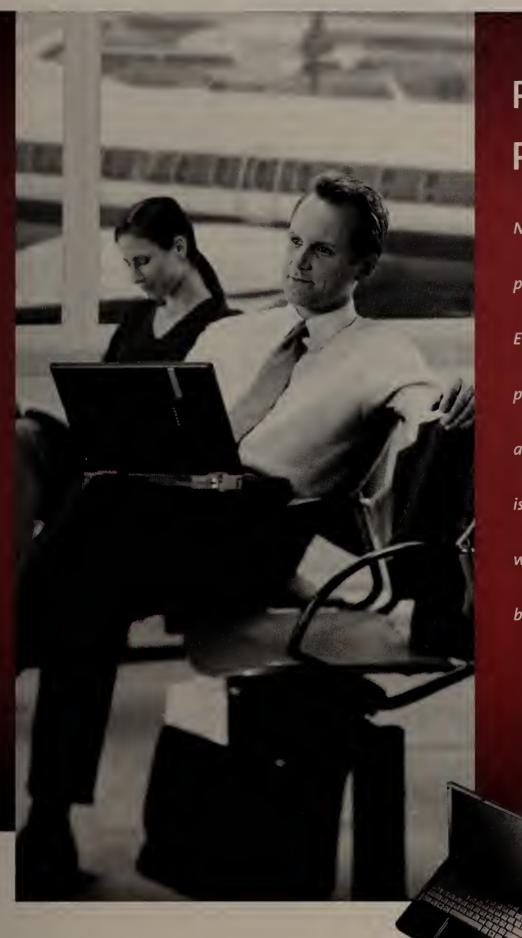
Cisco gets 40% of its revenue from service providers, which are accustomed to long sales cycles, deep discounts and vendor financing. "The types of customers that Cisco tends to finance are ones that cannot receive financing elsewhere, implying that Cisco is taking on risk where others won't in order to complete a sale," says Seth Spalding, an analyst at Epoch Partners, an investment bank.

Of course, Cisco's level of involvement in service provider financing (\$475 million) pales next to more-established telecom equipment makers. Nortel Networks has \$1.8 billion worth of vendor financing on its books and Lucent has \$1.3 billion.

And while the most recent quarter was disappointing by Cisco's standards, any of the vendor's major competitors would kill to be in its position.

Take Nortel. In January, it projected that earnings for 2001 would increase by 30%. In February, it abruptly downgraded that estimate, saying that 2001 earnings would be up only 10%, and announced plans to lay off 10,000 workers. Then in March, it threw another 5,000 into the layoff pool. (To give you some idea how traditional network companies differ from traditional telephone company hardware suppliers, Nortel has 94,500 employees vs. Cisco's 34,000.)

Nortel CEO John Roth has since repealed all growth projections and stopped issuing new ones, after the ebullient statements in January and



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# DOWNTRODDEN INFRASTRUCTURE VENDORS

Year-over-year quarterly results show how infrastructure vendors are struggling.

Vendor	Revenue for most recent quarter, compared with same period a year ago	Profit/loss for most recent quarter, compared with same period a year ago
Cisco	\$6.75 billion vs. \$4.36 billion (Oct. 29-Jan. 27)	\$1.33 billion vs. \$897 million
Lucent	\$5.8 billion vs. \$7.9 billion* (Oct. 1-Dec. 1)	\$1.02 billion loss vs. \$1.08 billion profit
Nortel Networks	\$8.8 billion vs. \$6.57 billion* (Oct. 1-Dec. 31)	\$1.41 billion loss vs. \$417 million profit
3Com	\$629.6 million vs. \$1.42 billion (Dec. 2-March 2)	\$122.8 million loss vs. \$97.4 million profit

<sup>\*</sup>Results for January — March quarter not available as of press time.

#### Outlook, continued from page 80

February incited investors to launch a flurry of class action lawsuits (see related story, page 99).

Last month, Nortel announced that its first-quarter results will be worse than expected because the U.S. economy continues to weaken and that weakness is spreading overseas. Nortel had estimated revenue of \$6.3 billion, but now says revenue will be between \$6.1 and \$6.2 billion, which analysts translate into a net loss for the quarter of between 10 cents and 12 cents per share. Roth has said that the slow U.S. market will likely drag Nortel down well into the fourth quarter.

And Lucent is in total disarray. In December, the once high-flying AT&T spinoff announced losses of more than \$1 billion on revenue that dropped 26% from the previous year. Lucent blamed the losses on the decline in the CLEC market, a slowdown in capital spending by established service providers, and investments in CLECs that didn't pan out. The company announced a restructuring plan that would slash 10,000 jobs, or 8% of its workforce.

### ONGOING OUTLOOK

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Nonetheless, Lucent stock went from a 52-week high of \$70 per share down to around \$7 per share. Standard & Poor's and Moody's Investment Service downgraded Lucent bonds from A- to one level above junk bonds, reflecting concern about Lucent's chances to return to near-term profitability.

The story at 3Com is similar. In late February, it said it would

lay off 1,200 employees because of the economic downturn and weakness in the telecom industry. In March, 3Com reported third-quarter revenue down 18% from its second quarter, and a \$223 million loss. After it announced those results, the company said it would drop its consumer Internet product line and make additional cost-cutting moves.

But all is not bleak. Cisco's third quarter sales will be 30% lower than second quarter sales, but the company still expects to turn a small profit. And CEO John Chambers predicts long-term growth in the range of 30% to 50%. While Cisco's cash and investments declined by \$1.6 billion as a result of those private equity deals with CLECs that failed to produce any gain, it still has \$18 billion in cash and investments to throw at research and development, acquisitions and product development.

It has dominant market share in routers and switches, a top-notch sales force and excellent management, and is staking out a leading position in new market areas such as voice over IP and wireless. The next few quarters will be "the ultimate test of these key strengths" for Cisco, says Bill Lesieur, an analyst with Technology Business Research, a market research firm.

And, in spite of the CLECs' problems, market research firm Infonetics Research predicts that sales of network equipment to service providers will jump 72% to \$24.4 billion this year. That's down from the 118% growth rate last year, but it's still healthy. "There are some service providers going out of business, but there are more entering the market. And the Tier 1 service providers still need to buy equipment to keep up with customer demands," says Kevin Mitchell, an Infonetics analyst.

# **Outlook:**

# Enterprise applications

▶ CAPSULE: CRM vendors will continue their strong growth in 2001, selling to the largest companies with the deepest pockets. Siebel is the clear market leader. As the definition of CRM expands to include new types of Web-based customer services, look for vendors to partner in order to offer service suites

Customer relationship management has dominated the enterprise software market for the past few years. The upswing came first as companies bought CRM software to automate their help desks or sales staffs. It continued as companies moved to eCRM software to improve the customer experience on their electronic-commerce sites.

CRM revenue hit \$4.4 billion in 1999, then jumped 54% in 2000 to \$6.8 billion, according to AMR Research, a research and analysis firm. But AMR predicts the growth will slow a bit this year, to about 44%, for revenue of \$9.79 billion.

The bulk of CRM revenue comes from extremely large companies, says Jim Shepherd, an AMR analyst. "There's an understanding on the part of senior management that you can use technology to retain customers, and it's clearly less expensive to hold on to the customers you have than to get new ones," he says. "And there's an understanding that changes in technology have made customers more demanding."

The economic slowdown means only that companies will be more picky about the CRM software they choose, not that they'll stop buying it, says Kirsten Cloninger, an analyst at Cahners In-Stat Group, a market research firm. "The enterprise market will continue to plow ahead and implement solutions to manage customer relations, as well as supplier and partner interactions. CRM is a strategy more than a technology — in other words, it's a must-have," she says.

Siebel Systems is clearly the dominant player. It posted revenue of \$1.8 billion in 2000, up from \$814 million in 1999, and profits of \$123 million, up from \$57 million. Other top players include Art Technology Group, Aspect Communications, BroadVision, Dendrite, Nortel (through its acquisition of Clarify), Oracle, PeopleSoft, SAP and Vignette.

# CRM IS GROWING STRONG

Customer relationship management vendors will see continued revenue growth through year-end 2001. Here's how the top 10 CRM vendors will fare, according to market research firm AMR Research.

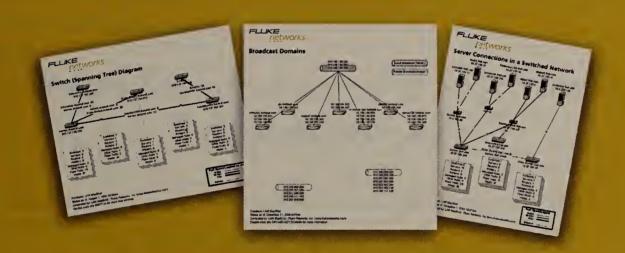
Vendor	2001 revenue (projected)	Increase
Siebel Systems	\$2.7 billion	51%
BroadVision	\$596 million	44%
Nortel Networks (Clarify)	\$507 million	29%
Vignette	\$488 million	33%
Oracle	\$416 million	41%
PeopleSoft	\$405 million	66%
Aspect Communications	\$291 million	20%
Dendrite International	\$198 million	5%
Art Technology Group	\$331 million	103%
SAP	\$347 million	155%

Of course, no matter how well-positioned a company is, it's not immune from a severe economic downturn. Robert Austrian, an analyst at Banc of America Securities, recently downgraded his earnings estimates for a slew of companies, including Siebel. He trimmed his estimate of 2001 software license revenue for Siebel from \$1.72 billion to \$1.68 billion.

The CRM trend for 2001 will be for vendors to broaden their applications suites through alliances and partnerships. CRM purchasers should look for vendors with a broad range of products, rather than a vendor with a single point product.



# 



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# start-ups-

Network World editors consider these top-notch network newbies sharp enough for the long haul. By Carolyn Duffy Marsan



Access360 **Arbor Networks** Asera **Cereva Networks** CoreExpress **Ecora** GiantLoop Network **Groove Networks Procket Networks Surgient Networks** 

You won't find any 20-somethings among the founders of the companies profiled here. Network World's list of the 10 start-ups to watch in 2001 consists of new ventures launched by experienced network professionals. These entrepreneurs are focused on the essentials: delivering products, attracting enterprise customer, earning profits and building lasting technology --- from content delivery to fiber optics, e-commerce to security. Expect to see some of them in future editions of the Network World 200, our annual ranking of the top public network companies by revenue (see story, page 54).

# Access360

Circling directory services problems with access control software.

ccess360 is the rare start-up, ACCESS360 THE NAME: with shipping products, highprofile corporate customers and recurring revenue. And it continues grabbing venture funding. Last

December, Access 360 raised \$41.5 million from bigname investors, including Crosspoint Venture Partners, Oracle and VeriSign. That gives the company enough money to ride out today's weak market for public offerings, officials say.

Access360 last month announced Version 3.1 of its enRole software, which lets companies manage access to 60 enterprise applications from Microsoft, Oracle, PeopleSoft, SAP and others. Customers buy one management platform, which runs on a central server, and client-based agents for each application they're tracking.

Company founders wanted to emphasize both access and their

360-degree, global vision.

Access360 has attracted 30 customers in the last 18 months, including BP Amoco, E-trade and Sony. The typical deal tops \$300,000, but annual fees often grow to millions of dollars as customers

add agents for new applications. Later this spring, Access360 will roll out a hosted version of its software for controlling application access by suppliers and customers outside the corporate firewall.

Access360 considers its employees invaluable assets and likes to show that through food. The company sends out wine and cheese baskets to new employees and caters in lunch and dinner every day (plus breakfast on Fridays). The company's goal isn't just to keep employees working during mealtime; it believes the central lunchroom fosters socialization across departments.

# Arbor Networks

Getting to the root of DDoS attacks with protection services.

mong a handful of start-ups trying to solve the distributed denial-of-service problem, Arbor Networks stands out for its technology, speed to market and investors.

Spun out of a research project at the University of Michigan, Arbor has its antidistributed denial-of-service system deployed across Michigan's Merit educational network. In addition to the Defense Advanced Research Projects Agency and Intel, Cisco helped fund the original project, and now is helping Arbor commercialize the research. Arbor has

ARBOR NETWORKS THE NAME: Representative of a group of trees, following the tradition of using tree names in networking.

received \$11 million from Cisco and Battery Ventures.

Arbor places appliances in the background of a service provider's network that gather IP traffic data from other network equipment. The devices are designed to trace distributed denial-of-service attacks and filter out offending traffic without affecting network speed.

Companies will pay a monthly fee for the distributed denial-of-service protection service, which is expected to be available through service providers and Web hosting companies this spring.

Beta testers include an Internet telephony provider and an online brokerage, as Arbor plans to pursue service providers and companies as

While building staff, Arbor is keeping its academic roots. Only five employees are located at corporate headquarters near Boston. The 20 members of the development team have stayed in Ann



# Asera

Bringing big names to e-business software.

ou can sum up Asera's appeal in a name: Vinod Khosla. The über-vcnture capitalist founded the company and drives its strategy, attracting a superstar lineup of directors and reeling in big-name corporate customers.

Network industry big shots on Asera's board include former Oracle President Ray Lane, Cisco CIO Peter Solvik, FedEx CIO Robert Carter and Janpieter

Scheerder, president of network storage at Sun.

Ascra's focus is helping manufacturers interact with distributors, resellers and direct customers over the Web in as little as 90 days. The company offers its software as a managed service and **ASERA THE NAME:** Derived from the Latin

root "acer," which means keen and eager. Asera interpreted the word to mean quick and adopted the theme of speed. Founders originally named the company Acera, but changed the spelling to avoid confusion with Acer, the Taiwanese PC manufacturer.

through licenses. Its third-party and homegrown code is modeled after Cisco's and Dell's e-commerce systems. With its e-business software shipping for 20 months, Asera has signed up customers such as Cadence Design Systems, Extreme Networks and Wyse Technology.

The environment at Asera is fast-paced and intense for its 375 employees. Conference rooms are named after the word for speed in different languages, such as the German "geschwindigkeit." Indeed, the company's software engineers work so frenetically that Asera has reserved a wing of a nearby hotel to accommodate them.

# Cereva Networks

Shaking up storage conventions with faster systems.

ereva Networks hopes to simplify and speed up the **CEREVA NETWORKS THE NAME:** way scrvice providers store and serve Web content. The company officially launched this January with a newfangled Internet storage system conceived by

A combination of "cere," for cerebral, and "va," the Spanish word for go.

Raju Bopardikar, a serial entrepreneur with experience in high-end graphics and parallel processing. Cereva's advantage is its technology, which combines high-speed data networking and massively parallel computing. Cereva's storage subsystem will exceed 1 petabyte of capacity, analysts say.

Cereva's development took off in early 2000, when Alan Lutz, former president of Newbridge Networks, joined as CEO. Lutz has attracted a veteran management team and established weekly meetings to keep the 240 employees up to speed on all aspects of the company's progress. Lutz rounded up significant investments from companies such as Sumitomo, which contributed \$20 million last November.

Due out this spring, Cereva's Internet storage system is being tested by NaviSite, an Andover, Mass., provider of Web hosting and outsourced network management services. Cereva's target customers are operators of Internet data centers, including Web content and service providers.

# CoreExpress

Guaranteeing Internet performance across multiple ISPs with extranet services.

Descriptive of the company's service,

which provides an Internet core for

expressing — or speeding up — the

delivery of data.

**ECORA THE NAME:** 

An electronic-sounding ver-

sion of Mount Chocorua, a

popular destination for hikers in New Hampshire.

oreExpress is the bestknown — and bestfunded — of a group of upstart service providers trying to make the Internet stable and secure enough to support critical business applications.

CoreExpress' claims to fame for its extranet service are performance guarantees, network visibility and security across multiple ISPs. The company's goal is to combine the flexibility, scalability and reach of the Internet with the performance and reliability of a private network.

It is pursuing companies with large supplychain networks, such as healthcare providers and manufacturers, as early customers for the CoreExpress service, which became available

**COREEXPRESS THE NAME:** across the U.S. last month.

> Company officials say they have plenty of money to build out the service quickly, having raised an eye-popping \$573 million in cash and credit from

key suppliers.

Internally, the major challenge for the CoreExpress management team is bridging the gap between the company's 200 employees in St. Louis and its 150 employees in northern Virginia; the company maintains dual headquarters in these cities. Toward that end, last fall the company reserved box seats at a Monday night football game between the Washington Redskins and the St. Louis Rams. The most fanatic fans at each location got to attend the game.

# Ecora

Scaling the systems mgmt. mountain with monitoring tools.

ounded by a pair of avid hikers who enjoy scaling mountain peaks, Ecora is a surprisingly down-to-earth company. The management team adheres to such old-fashioned concepts as focusing on customer needs, expanding staff slowly and pursuing profitability.

Angel investors, including former Compaq CEO Eckhard Pfeiffer and onetime Digital CEO Bob Palmer, have financed the company.

The board of directors includes John Rando, former Compaq professional services chief, and Morton Goulder, a founder of defense electronics giant Sanders Associates, which was acquired by Lockheed Martin.

Ecora offers two types of systems management tools: Documentors, which generate comprehensive documentation about key network components and applications; and IT Auditors, which monitor configuration changes in network hardware, operating systems and applications. Documentors are available for Lotus Domino, Microsoft Exchange, Oracle, Windows NT and 2000. IT Auditors are available for Exchange, NT and Win 2000.

With each software package available for as little as \$450 per server, Ecora has attracted more than 600 customers. Network managers use the software for troubleshooting, security assessments, IT audits, disaster recovery, server consolidation and network mergers.

Having grown to 85 employees, Ecora is trying to keep its small-company feel by hosting regular hikes and fishing tournaments. That should keep employees fit as they face the next summit: building enough revenue to cover expenses.

# GiantLoop Network

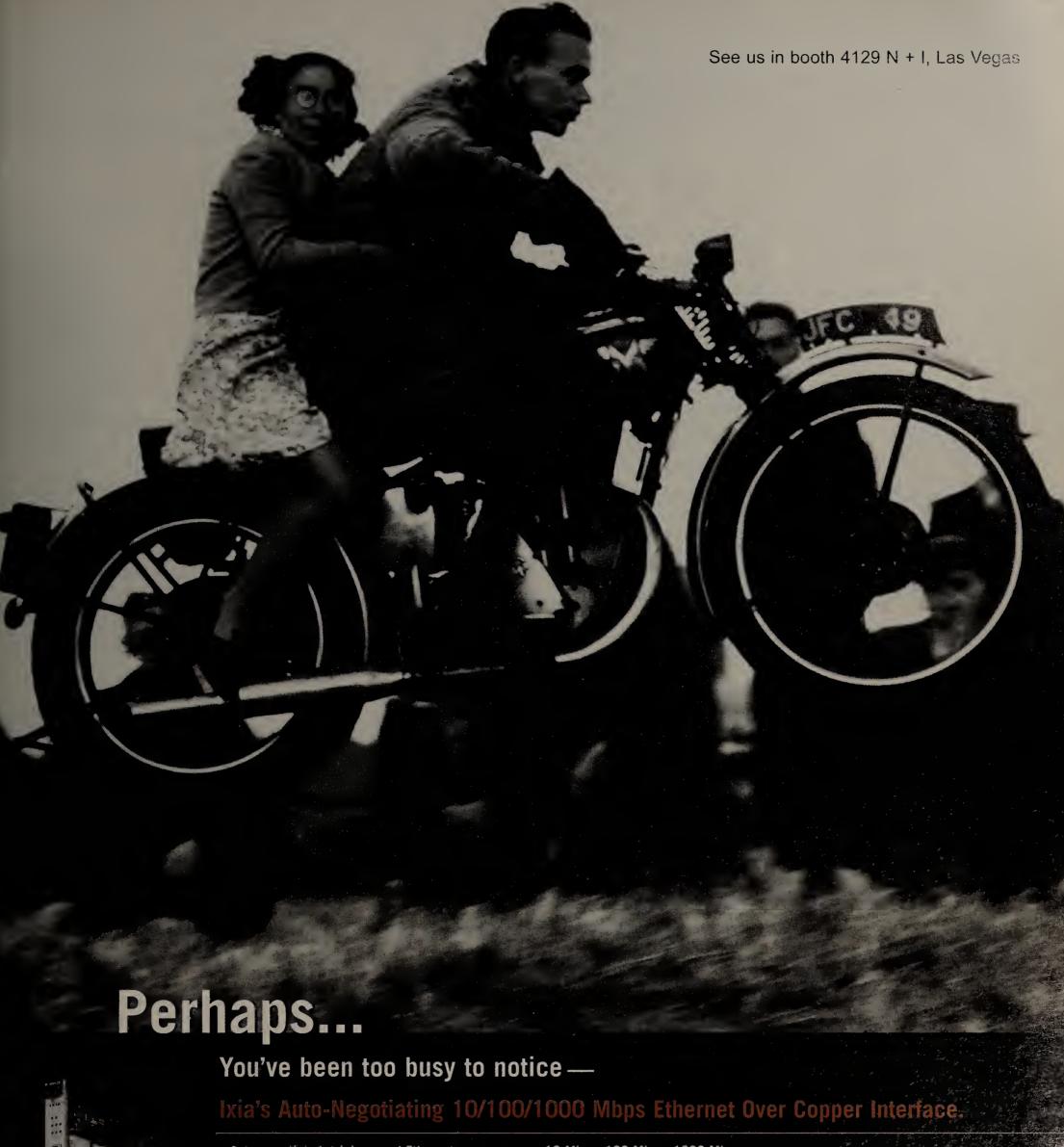
Lighting up cities with optical-network services.

alk about enterprise experience. Founded by former EMC executives, GiantLoop Network recruited its team of 300-plus employees from heavyweights such as Cisco, Comdisco, KPMG, Nortel Networks, Oracle and Sun.

Since June, GiantLoop has sold managed optical-network services to large firms that needed to send system and storage traffic between data centers. A typical customer is Options Clearing, which uses GiantLoop's service to send mission-critical data between two data centers.

GiantLoop operates fiber-optic backbones in Boston, Chicago, Dallas, London, New York,

See **Start-ups**, page 86



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Start-ups, continued from page 84

#### GIANTLOOP NETWORK THE NAME:

An extension of the network terms "local loop" and "metro loop."

Philadelphia and San Francisco. The company says it will extend into other cities and add new IP services, but won't elaborate on those plans.

GiantLoop's challenge is convincing IT managers they can outsource data center connectivity without sacrificing reliability. GiantLoop says customers will save money over a three- to five-year period.

Because it has such a serious sell, GiantLoop acts like a serious company. GiantLoop is highly disciplined and process-oriented for a start-up. Indeed, the management team has structured GiantLoop to scale quickly in hopes that it won't be a small company for long.

# Groove Networks

Peering into networking's future with collaboration software.

mong the crowded field of peer-to-peer networking start-ups, Groove Networks has a leg up, thanks to its leader, Ray Ozzie, creator of the popular Lotus Notes groupware application. Ozzie has attracted a stellar development team and big-name investors such as former Lotus chief Mitch Kapor and venture capitalist Jim Breyer, who sit on Groove's board of directors.

Groove operated in stealth mode for three years prior to its launch last fall. Last month, Groove began shipping a commercial version of its Groove Transceiver software, which financial services firms and pharmaceutical manufacturers use to communicate with customers, partners and suppliers over the Web. Groove's marketing strategy mimics that

#### **GROOVE NETWORKS THE NAME:**

Conceived over beers by company founders. However, all puns based on the word groove are outlawed in marketing material.

for Lotus Notes, with many sales through partners with vertical industry expertise.

Groove Networks is one of the biggest users of Groove Transceiver with 200 employees using the software to send instant messages, host instant meetings, filter e-mail and conduct online discussions. Nonetheless, Groove engineers continue to interact using an early peer-to-peer technology: massive whiteboards that hang in virtually every room of company headquarters in an old shoe factory outside Boston.

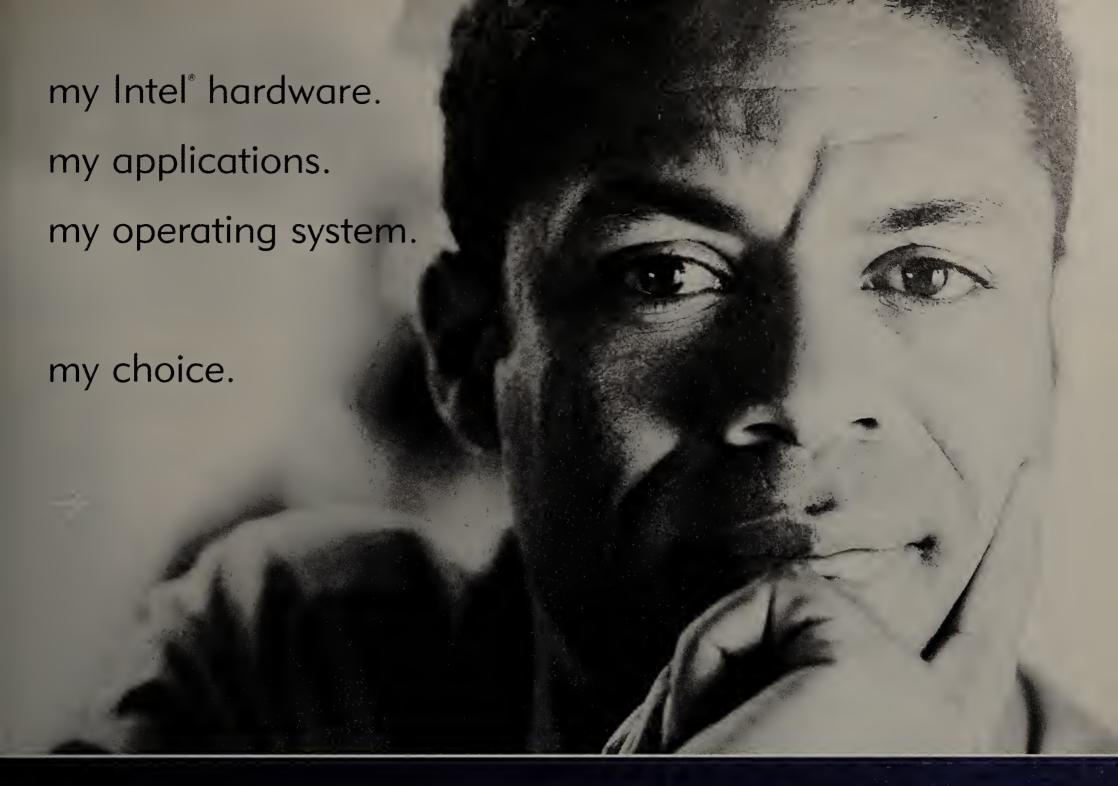
See Start-ups, page 88



# START-UP STATS

Here's an at-a-glance look at the 10 start-ups Network World has chosen to watch closely in 2001.

WATCH 20					
Company	Origin	Funding	Key investors	CEO	Products or services
Access360 Irvine, Calif. www.access360.com	Founded in January 1999 by Jeff Drake, former CEO of Technologic Software, and Yuri Pikover, a co-founder and former executive vice president of Xylan.	\$69 million in three rounds.	Amerindo Investment Advisors, Crosspoint Venture Partners, Oracle, Pivotal Asset Management and VeriSign.	Yuri Pikover	enRole, client/server software that controls access rights, passwords and resource provisioning for diverse systems and applications.
Arbor Networks Waltham, Mass. www.arbornetworks.com	Founded in August 2000 by University of Michigan researchers Farnam Jahanian and G. Robert Malan.	\$11 million in one round.	Battery Ventures and Cisco.	None	Managed availability services for ISPs and companies looking to combat distributed denial-of-service attacks.
Asera Belmont, Calif. www.asera.com	Founded in October 1998 by Vinod Khosla, general partner at Kleiner Perkins Caufield & Byers, with former Oracle executives Chin Hong, Kenneth Ng and Anil Nori.	\$175 million in three rounds.	Bowman Capital, Cisco, General Electric, Intel, KPCB, Nortel Networks and SAP.	Warren Weiss, formerly president and CEO of Prism Solutions.	A hosted software application that supports e-business transactions and integrates with e-commerce and back-office applications.
Cereva Networks Marlborough, Mass. www.cereva.com	Founded in April 1998 by Raju Bopardikar, founder of Stone+Wire, a movie post-production company specializing in high-end graphics processing.	\$106 million in four rounds.	Comdisco, Intel, Global Crossing, Goldman Sachs, Matrix Partners, North Bridge Venture Partners, Oak Investment Partners, Sumitomo and Worldview Technology Partners.	Alan Lutz, formerly president of Newbridge Networks.	An Internet-based storage system that combines high-speed networking and massively parallel computing.
CoreExpress St. Louis and Herndon, Va. www.coreexpress.com	Founded in August 1999 by Michael Gaddis, former CTO of Savvis Communications.	\$573 million debt and equity funding in an undisclosed number of rounds.	Benchmark Capital, Cisco, Hewlett- Packard, Morgan Stanley, Nortel Networks and Sycamore Networks.	Michael Gaddis	CoreExpress Extranet, a VPN service that offers performance guarantees across multiple ISPs.
Ecora Portsmouth, N.H. www.ecora.com	Founded in May 1999 by Alex Bakman and Bill Cronin, founders of CleverSoft, a Candle acquisition that sold monitoring software for Lotus Notes.	\$13 million in three rounds.	Eckhard Pfeiffer, former Compaq CEO, and Bob Palmer, one-time Digital CEO.	Alex Bakman	Software that generates documentation for network infrastructure components and applications.
GiantLoop Network Waltham, Mass. www.giantloop.com	Founded in April 2000 by former EMC executives Harry Dickson, Mark Ward, Randy Seidl and Chris Riley.	\$160 million in three rounds.	360networks, Cabletron, CNT, Greylock Ventures, Nortel Networks, Pilot House Ventures and Sycamore Networks.	Mark Ward	Managed optical network services — Agility Professional Services and Enterprise Optical Networking Services — available in six U.S. cities and London.
Groove Networks Beverly, Mass. www.groovenetworks.com	Founded in October 1997 by Notes inventor Ray Ozzie and three other Notes developers.	\$60 million in three rounds.	Accel Partners, Intel and former Lotus chief Mitch Kapor.	Ray Ozzie	Groove Transceiver, a peer-to-peer software platform for collaborative business applications.
Procket Networks Milpitas, Calif. www.procket.com	Founded in March 1999 by Tony Li, a founder of Juniper Networks, and Sharad Mehrotra and William Lynch, two former Sun processor architects.	\$34 million in two rounds.	Institutional Venture Partners, New Enterprise Associates, Redpoint Ventures and U.S. Venture Partners.	Randall Kruep, formerly senior vice president of Redback Networks.	Undisclosed Internet infrastructure products.
Surgient Networks Austin, Texas www.surgient.com	Founded in December 1999 by Scott Johnson, co-founder and former CTO of Compaq acquisition Thomas Conrad.	\$67 million in two rounds.	Austin Ventures, Cisco, Comdisco, Enron Broadband Services and individual investors such as Sun co-founder Bill Joy, Compaq co-founder Rod Canion, AOL co-founder Mark Seriff, Dell Ventures Managing Director Tom Meredith and former FCC Chairman Reed Hundt.	Nagi Rao, formerly president and CEO of Telecom Technologies.	A network platform that can provide differentiated levels of service for Internet applications ranging from content delivery to streaming media and storage.



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The state of the s



# Procket Networks

# Taking aim against Internet infrastructure kingpins.

rying to maintain a low profile, Procket Networks has released few details about its high-performance, scalable Internet infrastructure products under development. But the company is still generating a great deal of buzz because of its founders' reputations. Procket was formed two years ago by a trio of network superstars: Tony Li, a Juniper Networks founder and former router designer for Cisco; William Lynch, lead architect for Sun's next high-performance microprocessor; and Sharad Mehrotra, who led a Sun initiative to accelerate Java performance on the Sparc processor line.

ago by ny Li, a Combin former Lynch, Proits firs Sharad Metro

PROCKET NETWORKS THE NAME:

Combination of the words "processor" and "packet."

Procket hasn't said when it will ship its first products, but it announced that MetroMedia Fiber Network is one of seven carriers testing its software. Industry insiders believe Procket is developing a high-speed backbone routing system that will compete against Cisco and Juniper.

With such competition, Procket is a bit stiff. Procket employees work around-the-clock and on weekends without such typical Silicon Valley distractions as foosball championships and happy hours. The management team says it wants all employees focused on delivering products.

# Surgient Networks

Surging toward intelligent Internet content delivery.

t Surgient Networks, it's the box that's generating so much excitement. Neither a device nor an appliance, the company's network platform provides differentiated levels of service for an array of Internet applications including content delivery, streaming media and storage.

SURGIENT NETWORKS THE NAME:
Derived from "surge of intelligence."

Able to support gigabit speeds, Surgient's platform can sit at the edge of a network or reside in its core, depending on the application. Target customers include service providers, content providers and companies that need to provision end-to-end services.

One early partner is Enron Broadband Services, which is interested in Surgient's platform for delivery of differentiated services for streaming video and networked storage.

Exactly what's inside Surgient's box is somewhat of a mystery. But that will change this summer, when Surgient plans to announce general availability of its platform and its first customers.

# UP AND COMING

- Download charts detailing these 10 start-ups to watch.
- Be sure to catch our special 10 startups to watch programming at NetWorld+ Interop May 8-10 In Las Vegas, or on our NW200 portal after the conference.

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# When vendors promise the

Globalization of vendors may seem like a dream come true for IT executives outfitting international offices. But global contracts often turn out to be nightmares. By Julie Bort

he message from the Japanese office was a shocker. The global license for customer relationship management software painstakingly negotiated by a Charles Schwab IT executive had been declared invalid

Although affiliated with its U.S. counterpart, the Japanese CRM vendor was a legally independent entity — something the U.S. vendor failed to tell Daniel Keller, senior vice president of global technology for Schwab in San Francisco, when he contracted with it to deploy software in seven offices in five countries. Because Schwab's global license didn't include an appended contract directly with the Japanese CRM vendor, that vendor claimed it didn't have to honor the global license. Instead, it demanded that Keller buy another license just for Schwab's Japanese operations.

In the end, Keller decided it was less expensive to go with another CRM vendor in Japan. His advice is brush up on your vendor's corporate structure and your legalese before signing on the dotted line.

than 51% operating control of a joint venture, he adds.

For Michael Brady, first vice president of global networking services for Merrill Lynch in New York, trouble-ticket resolution was the international vendor-management shocker. When a network component in France failed, the vendor executing the global service contract pooh-poohed quick action, dismissing emergency calls from New York as American overreaction.

Brady countered by hiring a French expatriate to work at U.S. headquarters as the liaison to the overseas vendor. With the help of someone who spoke the language natively and understood both cultures, the vendor finally realized that speed is everything when it comes to stock trading.



As more U.S. companies expand overseas, IT executives discover that integrating far-flung offices is tough.

"Getting leverage overseas where we're in smaller offices is extremely difficult. We simply get more buying power and attention in the U.S.," says Mark Kissman, CFO of Current Analysis, a consulting firm with offices in eight countries.

Vendors preach that their globalization is your salvation and, in some respects, it can be. A vendor with multinational sales offices and offshore manufacturing facilities can help you outfit international sites better than those only in the U.S. They can save you money by sourcing locally and time by servicing devices on-site.

"Even if you operate only in the U.S. now, chances are that won't always be the case. So global service deployment of vendors should be important to you," asserts Robert Aanerud, trusted security adviser for security consulting firm Guardent.

Global vendor management is not as simple as choosing vendors with offices in the right countries. You must learn when to buy globally and when locally. You must work through a labyrinth of obstacles when resellers fulfill orders. You must base service-level agreements (SLA) not only on your needs, but also on local cultural norms.

#### **Getting equipment from here to there**

One of your biggest challenges will be figuring out the casiest and least-

And understand that a global license only applies if a company has more expensive way to outfit international offices with homogenous network equipment. In some cases, you should procure products and services locally, Aanerud says. Buying local security products is an obvious example, given the complications of international encryption laws. But another reason to source locally, he says, is few vendors deliver consistent quality worldwide, particularly when it comes to security.

> "I know carriers that in the U.S. do service and security well, but in the U.K., they're the worst I've ever seen," Aanerud says.

> Merrill Lynch's Brady uses this rule for local vs. global procurement: If the product is a commodity infrastructure service, such as frame relay, then contract regionally or locally. If the product requires customization or higher



SLAs, then construct a global contract.

Make sure you append those global agreements with contracts for each country's affiliate, Brady warns. "We don't want to deal with country-by-country contracts and forgo volume discounts for the stickier [more customized] services, like desktop services. For those, we usually structure an umbrella contract and then

attach to it a local contract for the region. Even a company as big as IBM has different legal entities to do business in various countries," he says.

Users and experts agree you should only procure and configure products in the U.S. and ship them overseas yourself under limited circumstances. Those being when international offices are in underdeveloped countries where IT equipment and talent is scarce; when each office houses only a few people; when the main goal of connectivity is Internet access and e-mail; and when outages that last hours to days won't stop your workers.

In such cases, shipping or even transporting the router to the site yourself can See **Global**, page 94

# The world as their factory

Where vendors manufacture products is less important than consistent quality controls.

exico, Scotland and Taiwan are popular sites for U.S. network vendor factories, while India, Ireland, Israel, Pakistan and Russia have become hot spots for software development.

Manufacturing offshore saves the vendor money, which is good for its financials, and, if you're a tough enough negotiator, your costs. But global manufacturing is infinitely more difficult than local manufacturing. The vendor that flubs it could face quality and intellectual property problems.

"Tariff policies early on encouraged offshore factories, and now complete manufacturing is often done overseas for many products. Of course, there are quality problems, especially in the sites where labor costs are quite low," says Bruce Kogut, professor of management at the University of Pennsylvania's Wharton School of Business in Philadelphia and co-director of the university's IT globalization research center.

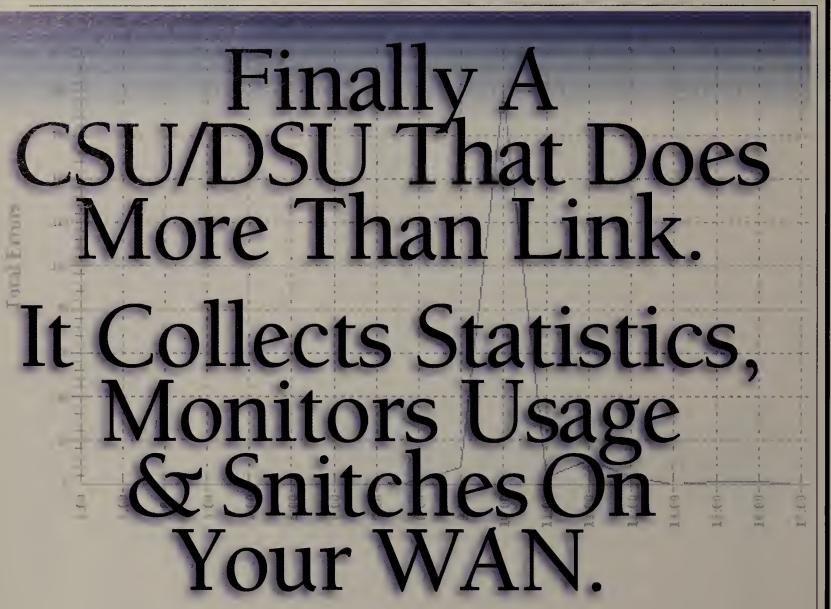
But quality needn't be an issue, if the vendor uses uniform quality-control practices, Kogut says.

The issues differ between hardware and software facilities. With hardware, a manufacturer will often outsource subassembly work but handle final assembly and system testing. It must test quality across suppliers. Major manufacturers, such as Cisco, Compaq and Sun, outfit offshore factories and subcontractors with homegrown quality-control tools. Compaq suppliers must run products through the vendor's five-step, audit-control process, a company spokesman says.

Cisco uses inventory control software that calculates hourly wage costs among suppliers and shift production accordingly, says Randy Pond, senior vice president of operations for the vendor.

For software, controlling intellectual property is tough. In many regions, people can legally take another's code, repackage it and sell it as their own. Kogut has seen that happen in India: "The American company did not properly protect its property, and it did not respect these contractors enough."

— Julie Bort





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Global, continued from page 92

work. So finds Ta Tanisha Scott-Baker, network support specialist for John Snow, Inc. (JSI), an international health consultant in Arlington, Va., with 20 offices in nine mostly underdeveloped countries.

"We find it's easier to buy equipment

It's very difficult in some of these places to get even simple things [such as] an A/B switch. I can't just go up the street to the corner store and buy one," she says.

JSI keeps a U.S. IT staff member on call 24-7 to handle IT emergencies in all time zones, supporting devices via the Internet.

But most companies quickly learn that

tion eauses more problems than it's worth. Shipping fees and tariffs to some parts of the world, such as Latin America, can cost more than the product itself, Brady says. Then there's the chance that your urgent replacement router could get stalled in customs. That often leads to the expensive option of storing replacement

Contracting with a single vendor for global supply can be a less-expensive choice, particularly for low-end products requiring little configuration and ongoing service, vendors say.

"Buying on a global contract, a customer gets global pricing," says Randy Pond, senior vice president of operations for Cisco. That would make a 24-port nonconfigurable switch inexpensive, he adds.

IT executives say global contracts also provide uniformity.

"The bottom line is speed to market. If we do a global contract with a single vendor, we get the network up faster and we don't have to invest in a network system design for each office," Schwab's Keller says.

Whether the vendor fulfills the global commitment itself or subcontracts to resellers doesn't matter to him — as long as the contract is clear. He just wants a single point of contact.

However, contracting directly with resellers offers strong advantages, Brady says. For instance, he can have multiple resellers compete for his company's patronage. That bidding often leads to lower prices than those in the global contract. Competing also teaches resellers that they must please Merrill Lynch, not the vendor.

Yet SLAs are a world unto themselves.To American sensibilities, a global service contract should include the same two-hour break/fix SLA in every country. But that's not a reality."We've not been able to get the same level of service from vendors for a 200-person office in Brazil, as for larger offices in the U.K.," Brady says.

Customer size notwithstanding, cultural norms interfere with consistent SLAs. It will cost big premiums in some countries to get response speeds considered normal in the U.S.

In countries where slower-than-acceptable break/fix is the norm, Brady recommends use of redundant components and systems that cover any point of failure.

Trial and error can't be avoided when it comes to global vendor management, but with a bit of planning, you can hold the whole world in your digital hands.

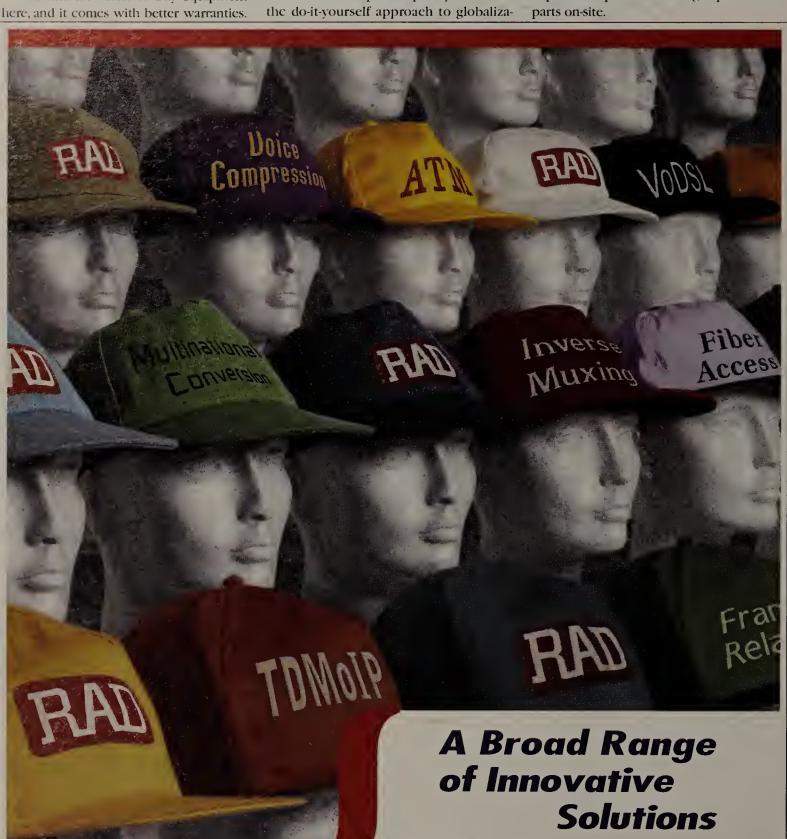
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As President/CEO of Caldera Systems, Ransom Love oversees the company's strategic direction and planning. Mr. Love has nearly 20 years of experience in the high-tech industry, where he has founded, managed and worked in such companies as Caldera, Inc., Novell and Sanyo Icon.



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# NetworkWorld 200 ENEGUTE PROFILES



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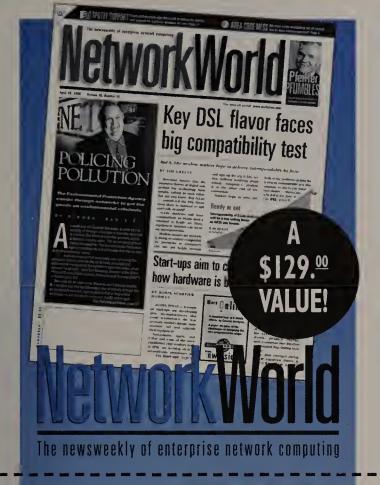
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In 1982 Eli Hertz founded Hertz Computer Corporation, which has won numerous awards for design excellence and outstanding performance from such prestigious industry publications as BYTE Magazine, PC Magazine, PC World and Computer Buyer's Guide. Seeing a need to provide organizational and space-saving solutions for Hertz' PCs customers, Hertz later founded Hergo Ergonomic Support Systems, Inc. Today, we are one of the leading original manufacturers of ergonomically designed, modular racking systems, technical office furniture and data and communications enclosure cabinets.



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Joseph P. Nacchio is Chairman and CEO of Owest Communications International Inc., a world leader in broadband Internet communications and applications services. Joe is chairman of the board of KPNQwest, the European joint venture of Qwest and KPN, the Dutch communications company. Prior to joining Qwest, Joe held senior-level executive positions at AT&T Corp.



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# Minding those Ks and Qs

Knowing how to decipher SEC filings is a good way to keep on top of your vendors' financial positions and a much-needed skill in today's volatile market. By Ann Sullivan



Ventro reported \$0 revenue for its fourth quarter of 2000. Yes, zero — a figure that pretty well encapsulates the spectacular decline of the business-to-business marketplace player whose shares hit a high of \$243.50 in February 2000 but fell to less than \$2 within the year.

It's easy to conclude that zero revenue equals an unhealthy company, and Ventro will likely never earn its way onto our Network World 200 list of the top public network companies (see story, page 54).

But not all financial reports are so easy to dissect.

Annual and quarterly securities filings, known as 10-Ks and 10-Qs, respectively, are filled with mind-numbing figures and grandiose statements that often obscure the most interesting content. Once in a while you'll find a real nugget, such as the fact that a company is saddled with insolvent customers or overwhelmed with inventory. But you have to know where to look.

For starters, consider more than just year-over-year revenue growth. Sequential quarterly growth can sometimes give a more accurate glimpse of current market conditions. Cisco sales grew 55% between the second quarters of 2000 and 2001. At that rigorous growth rate, the company would seemingly be insulated from the economic slowdown crushing so many network vendors. Yet Cisco fell short of earnings expectations for fiscal second-quarter 2001 by a penny — its first miss in more than six years — and instituted layoffs as one result.

So what gives? Read between the lines and you'll see that one of Cisco's

problems is its 3.5% revenue growth between its first (\$6.52 billion) and second (\$6.75 billion) quarters of fiscal 2001. That's quite a hit for a company that posted 14%, 16.3% and 13.1% revenue growth in the three prior quarters. In fact, sequential revenue growth hadn't dipped below 9% since the first quarter of 1999.

Clearly, Cisco can't sustain the double-digit earnings growth we've come to expect if it can't pull revenue growth out of the single digits. But that's not going to happen any time soon. Last week, Cisco warned it expects third-quarter revenue to be down about 30% from second-quarter revenue.

#### What's on the shelves?

Inventory, too, can tell an interesting story. While Cisco's revenue grew 3.5%, inventory levels grew 29% between its first and second quarters of 2001. These aren't percentages investors want to see, as the numbers suggest Cisco isn't selling equipment as quickly as expected — a suspicion confirmed last week when Cisco said it will take a \$2.5 billion charge for excess inventory.

Last fall, Nortel Networks found itself similarly stuck with rising inventory. Nortel's third-quarter 2000 revenue fell 7% from the second quarter, but inventory went up 21%. Nortel has since reversed the imbalance. Financial statements released in January show Nortel's fourth-quarter 2000 revenue up 21% from the third quarter and inventory up 7%.

But Nortel is by no means out of the woods. In January, the company briefly allayed investors' fears, saying for fiscal 2001 it still expected to hit 30% growth in revenue and operating earnings from the year-ago period. Then in February, Nortel unexpectedly downgraded growth expectations, saying revenue would rise only 15% and operating earnings would rise 10% in 2001. And Nortel announced plans to lay off 10,000 employees.

A month later, Nortel lowered the bar again, downgrading earnings

expectations for the first quarter of 2001 and adding another 5,000 to the layoff number.

Incidentally, the surprise February downgrade didn't go over well with investors. As a result, the company had to add a number of class action lawsuits to the risk factors listed in its annual report, filed in March.

One company that wasn't surprised by Nortel's February downgrade is Veritas Investment Research, a Toronto firm that sells research reports to institutional investors. Veritas predicted Nortel's miss well before February's bad news, calling into question the company's financial health based on what it saw as unclear accounting practices. Veritas points out that for the first nine months of 2000, Nortel reported "earnings from operations" of \$1.48 billion. Yet, when calculating its earnings using U.S. generally accepted accounting principles, Nortel had to report a "net income" loss of \$2.06 billion for the same nine-month period. There's a huge disparity between these two earnings numbers — a \$3.54 billion difference.

These figures are so far apart because, as Veritas notes, Nortel reports its "net earnings from operations applicable to common shares," a valuation that hit \$574 million in third-quarter 2000. But factor in acquisition-related costs, stock options and one-time gains, and you get a net loss of \$586 million.

#### Pay up, please

Another trouble sign is when receivables — money owed a company — rise faster than sales.

Delinquent customers are one of the problems that derailed Covad Communications, the DSL wholesaler that topped our 2000 list of the fastest-growing network companies (www.nwfusion.com; DocFinder:

3921). Covad billed \$78.1 million in its third-quar-

ter 2000, but recorded only \$66.7 million in revenue for the same period. Outstanding customer payments caused the discrepancy.

Covad's trouble spilled into its fourth quarter, too. In February, Covad warned it needed to delay reporting fourth-quarter and year-end results because of accounting issues that may erase as much as \$52 million in 2000 revenue. Not only that, but some revenue billed in the past will have to be written off as uncollectible.

Loose-lending Lucent ran into bad debt, too, for telecom start-ups it wooed with generous financing. Last fall, it was forced to set aside larger-

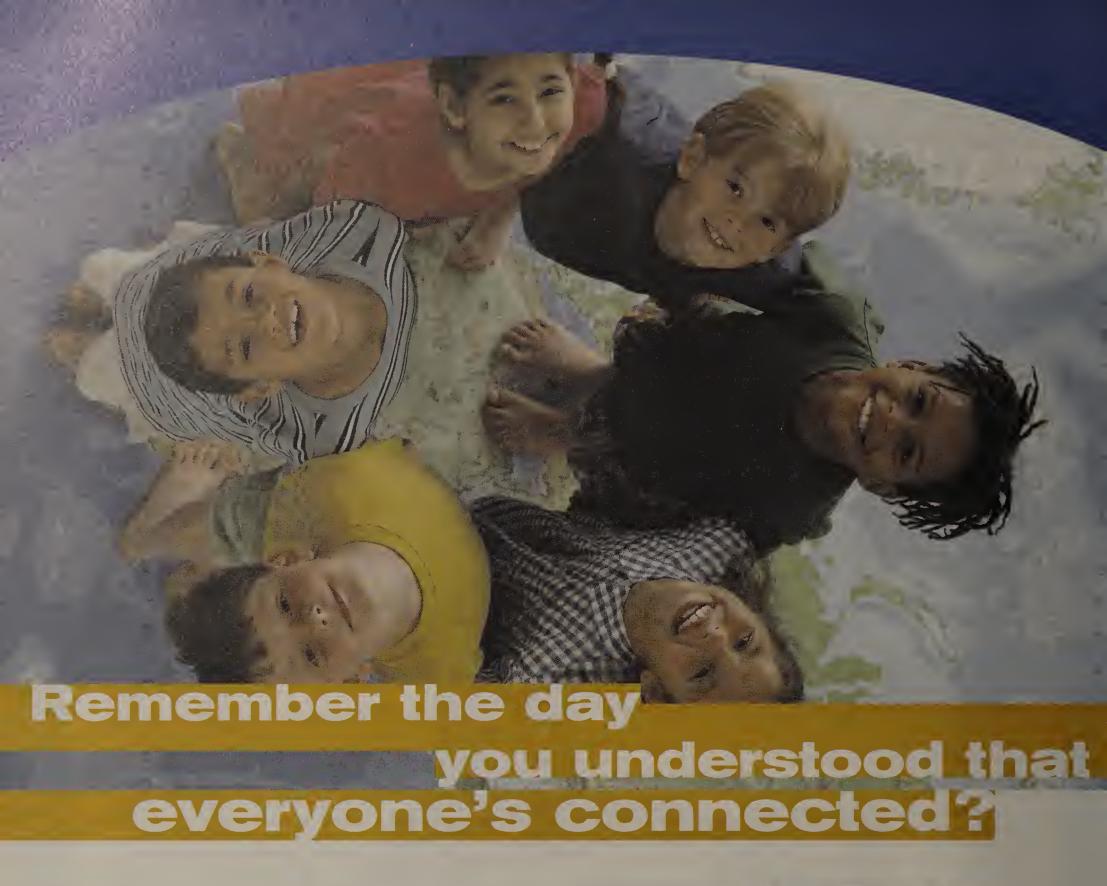
than-anticipated reserves for bad debt for those customers.

Like most companies, Lucent makes allowances for "doubtful accounts," but low-balling nonpayment allowances can make revenue seem healthier than it turns out to be. It's a risky practice at a time when companies are struggling.

Whitney Tilson, managing partner of Tilson Capital Partners, calculated that instead of increasing allowances for nonpaying customers, as would be prudent in tough times, Lucent was for the most part decreasing the percentage of revenue set aside. That figure went from 3.98% in third-quarter 1999 to 3.16% in third-quarter 2000.

Revenue-juggling is part of the reason Lucent revised its fiscal fourth-quarter 2000 revenue downward by \$679 million in December, a month after releasing its year-end financial statement. Now the Securities and Exchange Commission is looking into Lucent's revenue-booking issues.

Figures on inventory, accounts receivable and nonpayment allowances are all readily available in 10-Ks and 10-Qs.All you have to do is pick up a calculator, do the math and compare quarter-to-quarter shuffles. You may learn some interesting details about your vendor's financial health.



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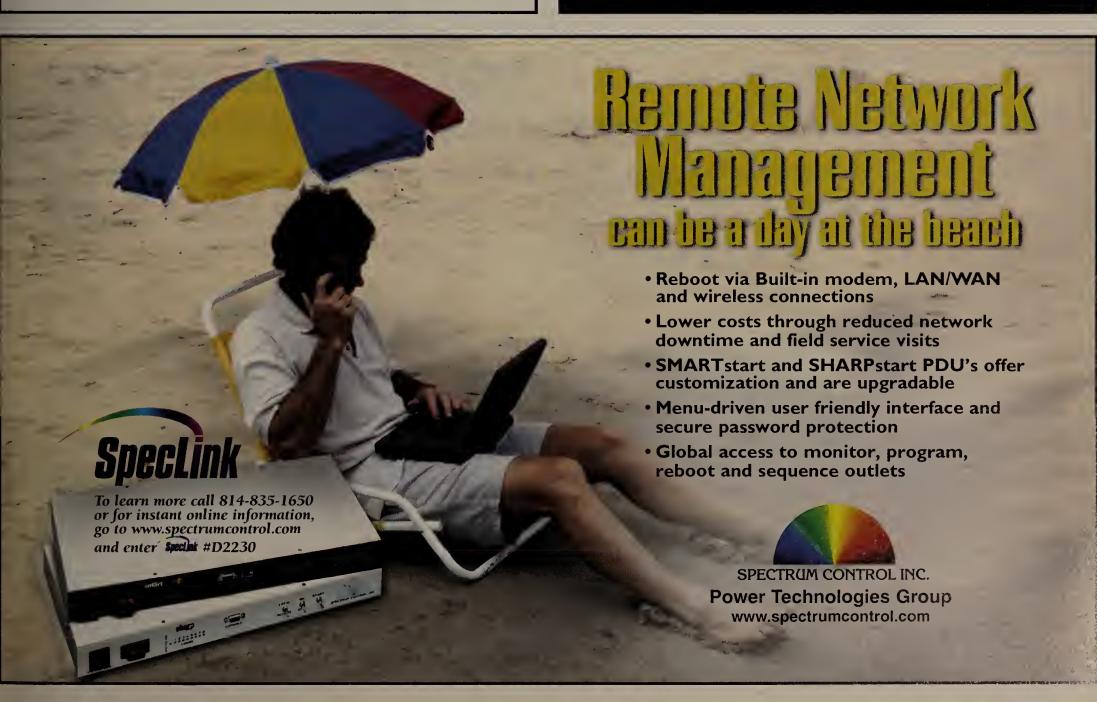
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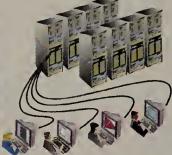




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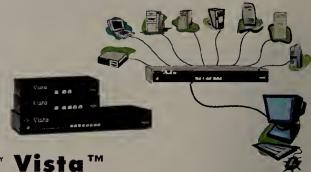
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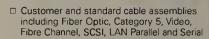
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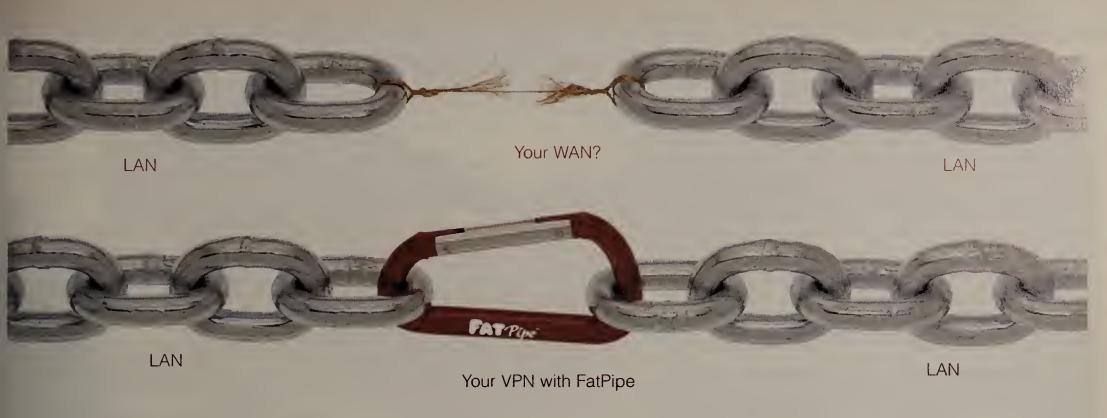
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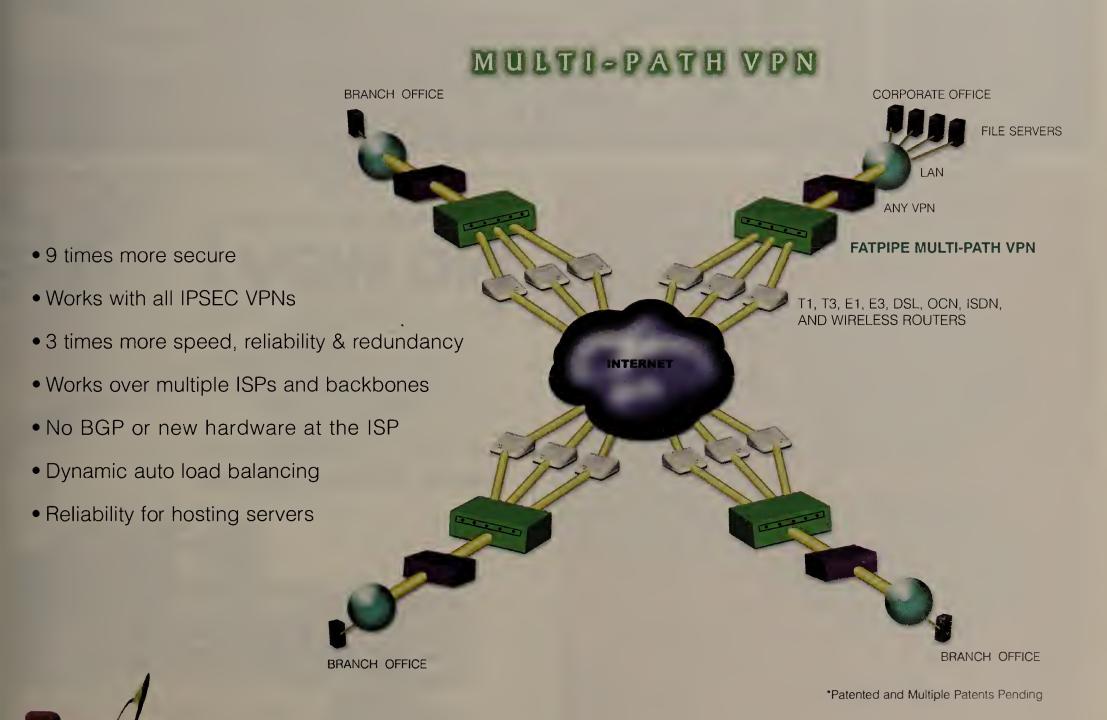
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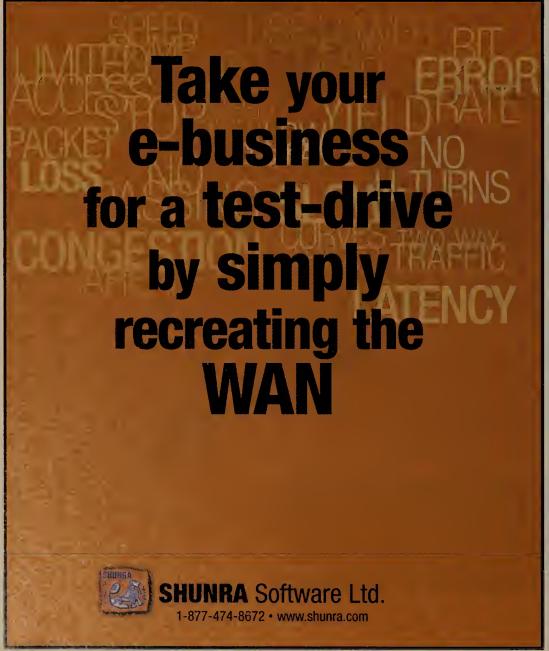
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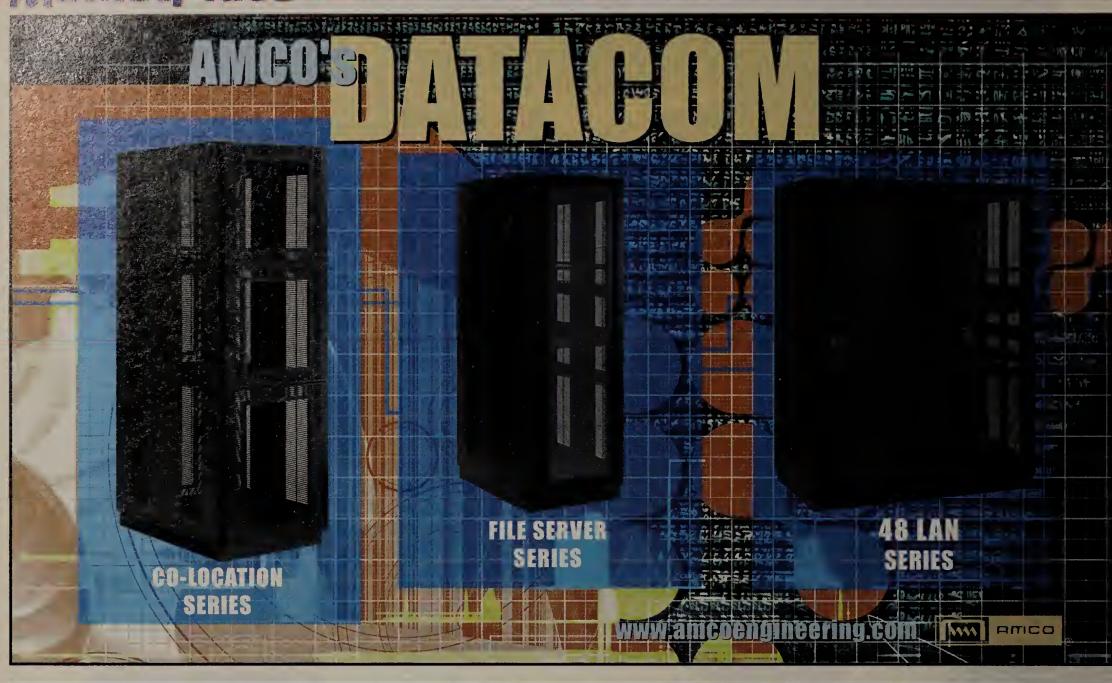
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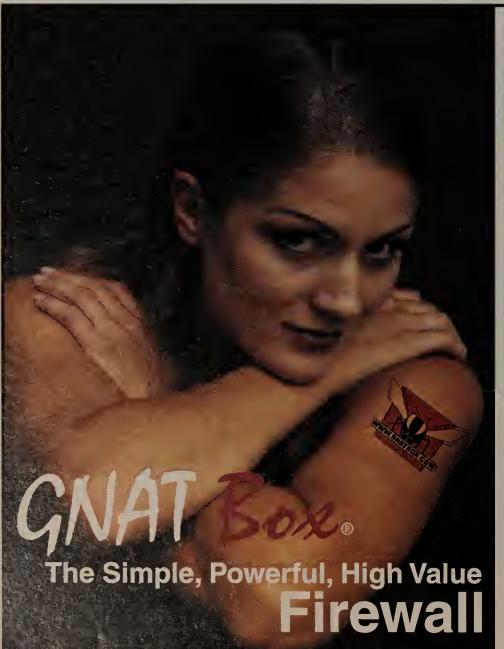




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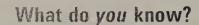
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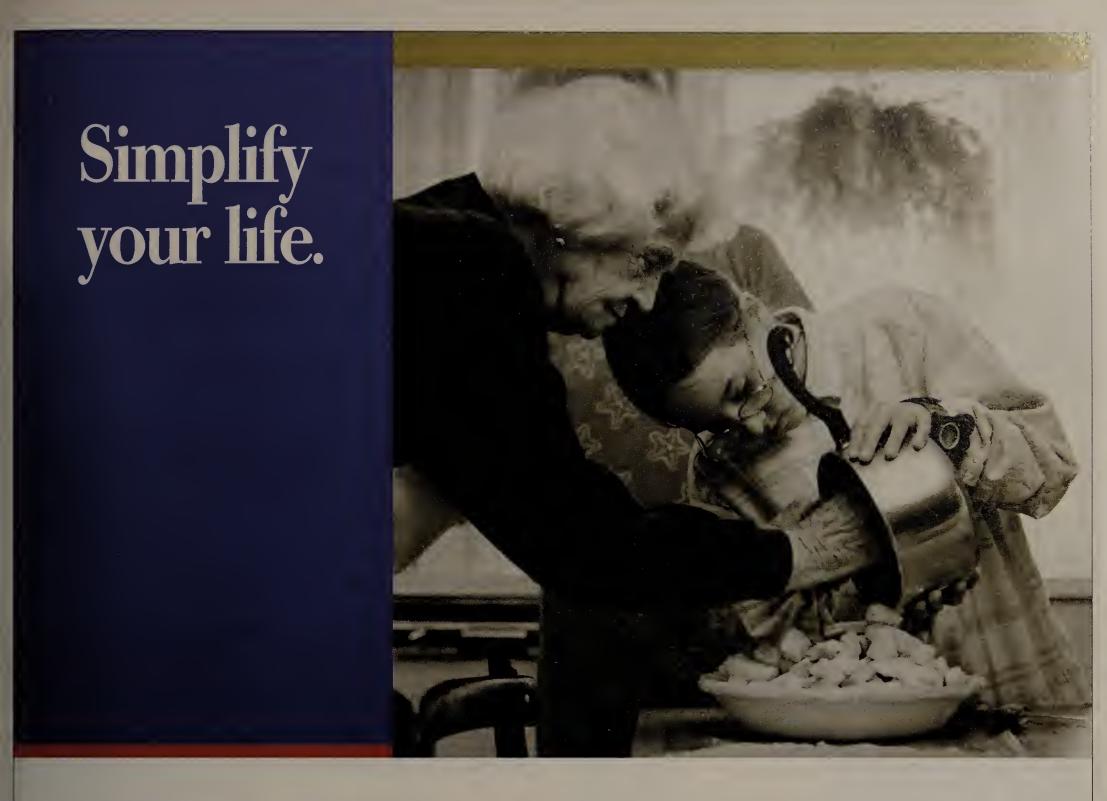
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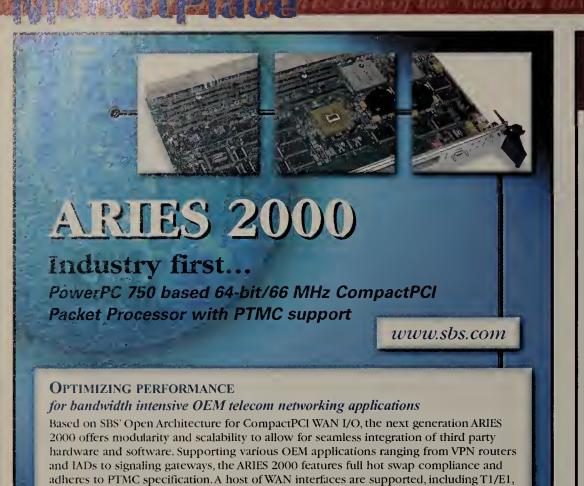




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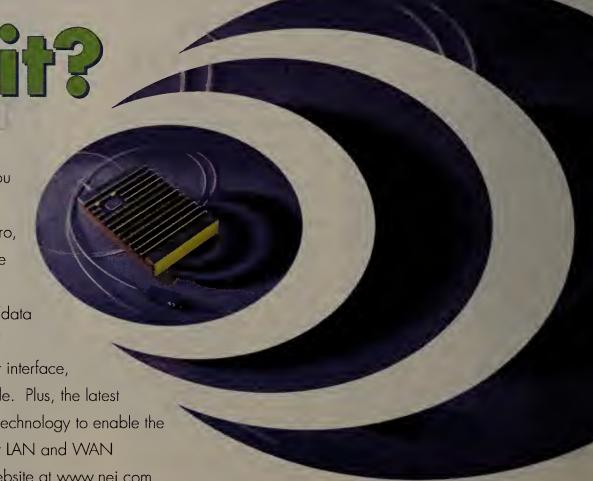
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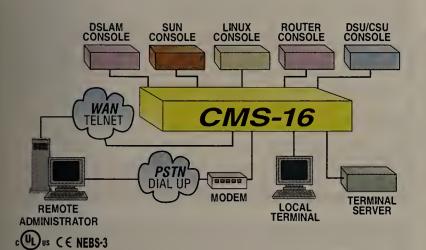
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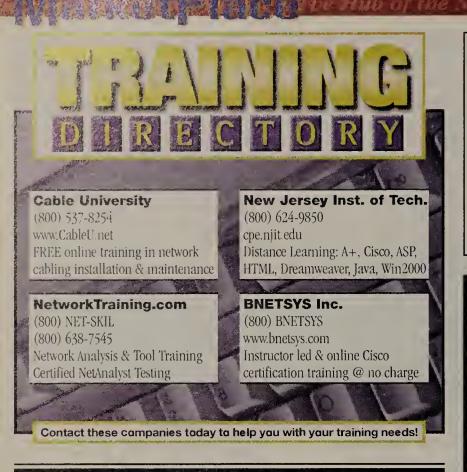


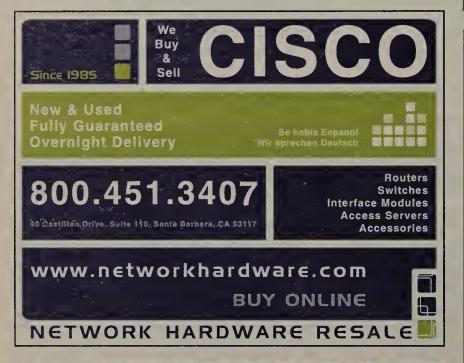


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Trainer/Superuser–Prepare Cross-Business Training Material, Process Docs., Metrics Compliance in Export Module. Work w/ERP Export Team to trans. Business and sys. rqmts. into functional & design spec for GEPS Parts Export Mgmt. System. Develop, test & implement for the Parts ERP Export Mgmt. System as an integrated module to Parts ERP OSBC Oracle Appl. Resp. for design & impl. of a rigorous cost, sched. & quality execution process & metric system in support of the Export ERP, & facilitate to replace the legacy COSDOM system. Must have at least a MS degree in CS or related field & 2 yrs.of exp. in the above position or 2 yrs.of exp.as a Quality Black Belt Parts ERP Export or related position. Able to use Legacy COSDOM system and knowledge of export operation procedures. DMAIC(6-Sigma) GB trained.

40.0 hr/wk. \$67,046/Yr. 9:00 AM -5:00 PM

Applicants send cover letter and resume to:

Linda Williams

GE Energy Sordicas 4200 Wildwood Pkwy Atlanta, GA 30339

Senior Technical Support Engineers: The Support Engineer will provide high-level technical support to developers of Imaging Applications, using Imaging SDK's (Software Development Kits). The Support Engineer will be responsible for constructing software algorithms and for their performance and limitations. In addition, the Support Engineer will write software sample code allowing customers to apply SDK functions and assist customers debug imaging applications. The Support Engineer will analyze customer requirements for creation of sample code, then code into computer program instructions using C/C++ programming language and Java, Java Script and Java Applets. The Support Engineer will also create system testing tools and program documentation. The Support Engineer must have excellent communication skills to interface directly with customers. Requirements: B.S. or (for) equiv. in Computer Science, Applied Math, Math or related and two (2) years of experience in the job offered or two (2) years experience in the related occupation of Software Development, Programming, or Network Administration. Also, demonstrated expertise in software design and programming using two of following: Visual C++, Microsoft Windows 32-bit Application Programming Interface (Win 32 API) or Microsoft Foundation Classes (MFC) environment; demonstrated expertise with imaging SDK for design of product. Offered salary is \$55,000/year for full-time employment (min. 40 hours per week) and standard company benefits. Multiple Openings. EEO. Submit 2 resumes and respond to Case No. 20010977, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Cinoni, Inc. (f/k/a i-cubator, Inc.) currently has openings for Chief Technology Officer, VP of Technology, Director of Technology, Business Analyst. Please fax resumes to 617-266-6776 attn Nancy Walls, email to careers & cinoni.com or mail to Cinoni, Inc., 40 Court St., Boston, MA 02108 Visit our website at www.cinoni.com

#### IT Technology:

Senior Systems Analyst (Customer Relationship Manager) in Conway, South Carolina. Respon sibilities include identifying developing, implementing and maintaining Information Technology applications. Reviews and modifies Information Technology applications for sales orde entries, invoicing, inventory pack aging and shipping. Manages outside Information Technology vendors. Confer with users to recommend and develop contin uous Information Technology upgrades. Train users and provides technical support such as troubleshooting Information Systems peripheral equipment Conduct studies pertaining to development of new Information Technology applications to meet current and projected needs. Must have a Master's of Science in Computer Science or Mathe matics or employer will accep three years of experience as a Consultant, Programmer Analyst or Database Administrator or Bachelor's degree and five years experience in lieu of Master's degree and three years experience. 9 AM to 5 PM Monday through Friday, \$90,402/year.

Each applicant must forward two resumes and reference Job Order number SC2001257. Please forward two resumes to Ms. Regina D. Ratterrree, E&T Technical Services, SCESC-SC2001257, P.O. Box 1406, columbia, SC 29202. Honeywell is an equal opportunity employer.

Network Analyst to analyze client's terrestrial & satellite networking environments. Plan design, Install, monitor & troubleshoot communication networks (LAN/WAN) & Voice over IP (VoIP) networks. Troubleshoot routing, switching, hardware & software problems on voice & data circuits. Proficient in Cisco-based VoIP systems Cisco routers. IP network components, windows NT & Unix operating systems, SNMP based monitoring platforms. In depth understanding of International El signalling standards for data & voice circuits. Degree exp req. Competitive salary Mail/fax resume VERESTAR 15590 NW 15th Avenue Miami, FL. 33169 (305) 627-6001

Principal Software Engineers Will formulate and design soft ware products using scientific analysis and mathematical models to predict and measure outcome and consequences of design. Duties include: the design, implementation and support of manufacturing appli-cation modules within an objectoriented, distributed transaction processing framework on Unix and NT. Will design, implement, and deploy on-site 3-tiered object-oriented client-server systems for semiconductor manufacturing executing systems (MES). Will develop and direct software product testing procedures, programming, and documentation. PSE will consult with engineers and engineering team to evaluate interface between hardware and software and operational and performance requirements of overall system Requirements: BA/BS (or for equiv) in CS, IT, any Engineering major or related field and five years (5) progressive experience in the job offered or in the related occupations of developer, soft ware designer, systems analyst, or related. Also, demonstrated expertise with C++ development on UNIX and Windows NT platforms; with object-oriented design in a distributed systems environment; and with SOL database an base applications programming. Offered salary is \$85,500/year for full-time employment (min. 40 hours per week) and standard company benefits. Multiple openings. EEO. Submit 2 resumes and respond to Case No. 20011153, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Senior Member of Technical Staff-Network Management: Will design and develop state of art network management systems for broadband hi-speed network access devices. Responsible for defining functional specifications for business application software, such as provisioning VPN and Voice Over IP (VoIP) on top of network access devices. Will design architecture, write design documents, implement and designer test software. Will work directly with SNMP protocol and network provisions and performance monitoring software using Java, EJB (Enterprise Java Bean) on Sun Solaris platform and C++. Requires a Master's degree in Computer Science or Electrical Engineering or a closely related field, plus 3 yrs. experience in job offered or 3 yrs. experience in job offered or 3 yrs. experience in Telecommunications Network Management Engineering. Must also possess demonstrated expertise developing network provision and performance monitoring software on Sun Solaris platform using C++ and Java programming languages. 40+ hrs/week; 9am-6pm (M-F); \$90,000.00 - \$110,000.00 per year. Must have unrestricted authorization to work in U.S. Submit resume in duplicate to: Case #20012089, Labor Exchange Office, 19 Staniford St., 1st Floor, Boston, MA 02114.

Application Programmer (Prog-Analyst). Design comp. apps, write app source code, & validate s/w; determine feasibility cost, & time reqd to write programs; consult w/ users to ID current operating procedures & clarify programm objectives to meet user reqs; formulate plan outlining steps read to dev apps use structures analysis, charts & diagrams to illustrate sequences programs must follow & describe operations involved; convert project specs to instructions & coding steps to run & test programs write source code to validate outputs by other apps. Req: MS in Engg (Elec, Comp, or s/w), Stat, Physies, or Psych; & 3 yrs comp app s/w programm exp w/n science or engineering, involving 1) dev & support of comp s/w apps on 2 MS OSs, & 3 of: VMS, AS400, UNIX, IRMX, or embed ded UNIX; 2) s/w dev/modification using 4 of: Ć, C++, Basic, Ouick Basic, Assembler, C shell, embedded C, PL/1, Visual Basic, Java2, or SAS; & 3) use of dBase III, Oracle, or Paradox to store or retreive data from s/w apps noted in #2. Send resume to: Al Montalvo, APS, 110 W. Main St, Ste 2F, Carrboro, NC 27510, or call 919-932-1340.

Systems Designer/Developer needed in Tampa FI, 8:00 am. To 5:00 pm, 40 hours per week. Salary, \$85,000.00 per year. B.S. in Mathematics req. Responsible for translating level specifications for software components into designs and to implement those designs. Will integrate commercial off the shelf software with custom software to provide seamlessly tailored solutions for the design of implementation of business objects, client applications and user interface software. Directs direct implementation activity of developers, designs and develops technology and business/domain object models, identify design alternatives that will implement a solution to an analysis model, evaluate design alternatives for development cost, run-time performance and software complexity trade-offs, recommends appropriate design alternatives to be implemented based on customers constraints. Design solution using various 00 methodologies; perform integration testing with the quality assurance administrators, subject matter experts and the user interface architects. Send resume to Agency for Workforce Innovation/Bureau of Workforce Program Support, P.O. Box 10869, Tallahassee, FL 32302 RE: JOFL #2169912.

Web Developer: Will use Cold Fusion, SOL, and HTML to design, develop and modify various relational database management information systems applications to be used and accessed in a web environment. Determines development tools to be used for implementation and maintenance purposes and creates web systems architecture to allow flexibility and versatility of web use based on end user's informational needs. Requires Bachelor's Degree in Computer Science, Electrical Engineering and Computer Science. Also requires three months experience in the job to be performed. Hours: 8:00 a.m.-4:30 p.m. Days Worked: Monday through Friday, 40 hours per week at \$41,500.00 per year salary. Job Location: Myrtle Beach, South Carolina. Applicant must submit two copies of resume, with reference to Job Order number SC2001278 to: Ms. Regina D. Ratterree, E & Tecnnical Services, SCESC-2001278, Post Office Box 1406, Columbia, South Carolina

SOFTWARE ENGINEERS (8 positions): require Bachelor's in Engineering/Computer Science Mathematics/Science or closely related field with experience providing skills in described duties, at \$70,000 per year; Senior Software Engineers (8 positions) with Master's and experience, at \$75,000 per year Provide on-site consulting in design, analysis and development of software applications for legacy systems in IBM mainframe environment; development and administration in Oracle, DB2 SOL Server and Sybase; e-commerce and web applications development in Microsoft, Java and related technologies; network management systems develop-ment with Netscape Server and related tools; SAP R/3 applica tions on Windows with DOS and ABAP/4 and related modules 40% travel to client sites in the United States. Mail resumes to Y & L Consulting , Inc., 7550 I H 10 West, Suite 940, San Antonio,

Ouantitative Analyst/Snr, for insurance & financial services co. in NY to research, analyze 8 develop proprietary models; manage & direct development team to design, develop & test risk management system in Risk++, RiskScript, Java, Unix, Oracle & Perl; develop specifications & integration using structured analysis & design develop customized stress testing application to evaluate ris exposure by applying state of the art computer technology, advanced quantitative techniques & finance expertise in fixed income, equity & foreign exchange (including exotic options); 40 hrs/wk. Musi nave Ph.D. in Physics, Compute Science or Mathematics and 2 yrs in job or 2 yrs as Technical Specialist. Contact AlG, Inc., H.R. Dept., 70 Pine St., New York, NY 10270.

Software Engineer: Analyzes and configures an SAP R3 computer system using ASAP methodology to insure optimization of various enterprise-wide business applications. Insures proper integration of various systems modules, including logistics, purchasing, pricing, and retail information, and performance of system based on end user requirements using SAP DDIC, SAP, BAPI, SAP Scripts and Report writer. Requires Bachelor's Degree in Computer Science or any Engineering Field. Also requires two years experience in the job to be performed. Hours: 8:30 a.m.-5:30 p.m. Days Worked: Monday through Friday. 40 hours per week at \$70,000.00 per year salary. Job Location: Myrtle Beach, South Carolina. Applicant must submit two copies of resume, with reference to Job Order number SC2001269, to: Ms. Regina D. Ratteree, E & Technical Services, SCESC-2001269, Post Office Box 1406, Columbia, South Carolina 29202.

System Software Developer: of new tools/technologies & components of MaxxServer system. (e.g.: campaign management, ad serving, statisitics collection, e-mail management, system administration. etc.) Develop database schemes to support storage retrieval, cataloging & management of content, support customer roll out, on going support of components.

Req: MS or equiv. in Computer Science, Engineering or related field; 6 mos. - 1 yr exp in mathematics & computer science, incl. Wavelet theory & analysis, digital video & image processing, and 1-3 yrs exp in programming in C, C++, HTML/XML, Java, JDBC, Java serverlets, and Java server page. 40 hrs/wk, \$53,750 - \$70K/yr. Interview/job site: Raleigh, NC. Send resume to: Mona McCail, Office Manager, Summus Ltd., 434 Fayetteville Street Mall, Suite 600, Raleigh, NC 27601

DIRECTOR OF NETWORKING

SERVICES to serve as the echnical lead for the company's consultants in all networking services, including LAN, WAN. telecommunications, voice and data integration; Develop new areas of expertise in networking within the company; Support company customers in the design, development and management of international and domestic telecommunication networks; Perform stated duties using TCP/IP networking protocols, routers, switches, ethernet and fast ethernet Require: Bachelor's degree (or foreign equivalent) in Computer Science, Electrical Engineering, or a closely related field with 3 years of experience in the job offered or in sr. level network management/administration; Prior experience must include 3 years developing computer networks using TCP/IP networking protocols. Salary: \$80,000 per year. 8 am to 5 pm, M-F. Send resume to: William Beyer; President, Business Equipment Center of Atlanta, Inc., 2090 Faulkner Rd., NE, Atlanta, GA 30324; No Phone Calls Please

SOFTWARE ENGINEER to develop software applications for interactive services architecture projects; develop Unify Modeling Language implementation for interactive TV services; develop test plans and design specifica-CORBA, Java, C++ and RPC languages on Linux operating systems and on Sun Solaris OS; work with Video-On-Demand servers, Business Management Systems and MPEG2 Digital TV platforms. Require: Master (or equivalent) in Computer Science/ Management with two years experience in the job offered. Salary: \$71,000 per year, 40-hour week, M-F. Apply with resume to: Vice President of Engineering, N2 Broadband, Inc., 4500 Rivergreen Parkway, Suite 110, Duluth, GA 30096.

Developer/supporter of aerial image-based terrain info soft-ware/hardware requires: Soft-ware Developers w/Bachelors/ equiv in Comp Sci, MIS, Remote Sensing/related & 5 yrs exp in design, development, testing in OO progg w/C++ in Windows NT including 1 yr Java exp. May have Masters/equiv and 2 yrs same exp.

Asia-Pacific Business Coordinator w/Bachelors/equiv in any discipline & 5 yrs exp in technical mktg or engg in an earth imaging field for Asian-Pacific market. May have Masters/equiv & 2 yrs same exp. Resumes to T Taylor, Z/I Imaging Corp, 301 Cochran Rd, Suite 9, Huntsville, AL 35824

Programmer Analyst wanted

by a comp consulting services
Co. in New Jersey. Must have
Masters Degree in Comp. Engineering or Computer Science &
1 year experience. Respond to
H.R. Dept., Laxmi Consulting
Services, Inc., 200 Essex
Turnpike, Suite 201, Iselin, NJ

## Programmer Analyst

Wanted by Information Technology Consulting Firm in Newington, CT. Must have B. S. in Comp. Science or Electronics or related field & 5 years of progressive experience in designing and developing ERP and business applications, customizing and interface various modules like accounts receivable, accounts payable, general ledger, etc. Respond to HR Manger, Infowave Systems, Inc., 705 N. Mountain Ha., Newington, CT 06111.

"Needed Jr. Web Developer to create Web related technical designs, collect data, create Web based reporting system using Java, HTML & Perl based programming. Must have High School plus 2+ years of experience in similar occupation. Send resume, in duplicate to HR Manager, System Edge USA, 811 Sefert Street, Philadelphia, PA 19128."

Database Administrators, Atlanta, GA. Database implementation & support to users on database apps & network administration across platforms using knowledge of Sun Solaris, HP-UX, IRIX, Linux, Windows NT & Novell NetWare. Req: BS or equiv. in a tech field & 2 years exp in system admin or network design. \$65K & up. Resumes to: V Ganupuru, Instcomp, Inc, 4501 Circle 75 Pkwy, Suite C-3140, Atlanta, GA 30339

Full-time Software Engineer responsible for analyzing user requirements, procedures and problems to automate processing or to improve existing computer systems using C/C++, CGI, UNIX, object-oriented programming, Database programming, Database programming, Database programming, Web Server, Java, SOL, MySOL and Analytical Skills. Set up and contiguration of web site server. Must have a Bachelor's Degree in CS, related field, or foreign degree equivalent. Must have 1 yr of experience in job offered or a position with same duties. Salary: \$65,000/yr. Send resume to: Rachael Henderson, WellFound Technology, Inc., 1395 S. Marietta Pkwy., Bldg, 400, Ste. 208, Marietta, GA 30067.

Director, Pre Sales Technolog Manage pre-sales division analyze customer environments & create solutions based on AMTrix products and services Act as link between product management, development, & sales, & train sales/pre-sales team. Req: BS in comp sci or enggring & 3 yrs exp with sales & deployment of enterprise application integration software (AMTrix), including 1+ y managing implementation proects. Resumes to: D Hull, Viewlocity, Inc. 3475 Piedmont Rd, Ste 1700, Atlanta, GA 30305

Systems Analyst needed for Tampa computer consulting firm M-F, 8-5, to analyze user requirements, procedures and problems. To automate processing and improve existing computer systems. Bachelor's degree in Computer Science or its academic equivalency required. Competitive Salary. Fax resumes to L. Mitchell 813-286-2264.

Director of Customer Service.

Responsible for pre-sales/postsales and tech. support for Vista; sales process support/professional services; implementation and customization of the solution and on-site training; developing new training materials; support level 1&2 and software development. Must have BS/Comp. Sci. related or equiv. & 2 yrs. exp. in the job offered or 2 yrs. exp. as Soft. Eng. Send resume to HR, Allen Systems Group, Inc. 1333 Third Avenue South, Naples, Florida 34102. No calls.

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Greenville, SC
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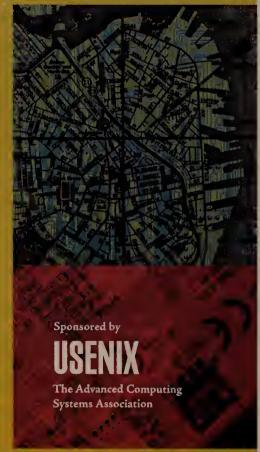
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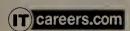
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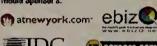
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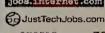
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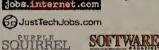
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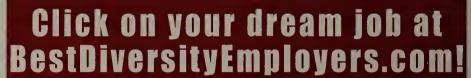
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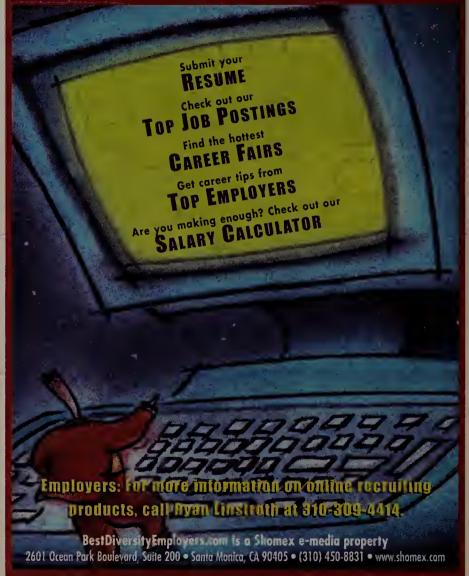
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Tropicana and Frito-Lay. Ron Porter, vice president
of corporate human resources in Purchase, NY, says
the approach to diversity is focused on three fronts.
"We want to insure that we can understand and
develop our business in an increasingly diverse
marketplace," he explains. "We want to insure that we
can retain and attract the best and brightest talent.
And, finally, we want to insure that our partners that
supply us goods and services are diverse. In the end
it is about getting results and getting them in the right

way. We believe that our ability to leverage our diversity will be key to our success."

Bill James, senior manager of global diversity for Santa Clara (CA)-based **Applied Materials**, says his company continues to work with universities and professional organizations to recruit top candidates into the industry, building the pipeline of diversity, leadership and talent. "The face of **Applied Materials** is a mix of people from Asia, the Middle East, Africa, India and the Americas," says James. "When you walk through our facilities, you see diversity."

Mary Tetro, human resources vice president for **Pitney Bowes'** Tech Central, says valuing and expanding diversity is a business fundamental, something that spans decades of the company's history. "As we expand our understanding of globalization, we need to understand various cultures around the world and the business

approaches used in very different world regions," she says. Every business unit within **Pitney Bowes** develops a business plan that links directly to the business strategies and employee diversity. A measure is taken annually of accomplishment toward diversity goals, just as a measure is taken concerning revenue growth and operational efficiency.

In all three companies, valuing diversity is integral to the business process, whether in developing the latest technologies for route salesmen or the latest technology that will thrust the semiconductor industry forward another step.

### What attracts diversity?

These leaders believe there are several simple steps to attracting a diverse workforce. The most important is being diverse. Just as important are the technological challenges and the pace of innovation.

For **PepsiCo**, that means partnering with the business leaders to provide technologies that help them manage a global consumer product business with a massive direct-store delivery system. This might mean working extensively with hand-held technologies that support the front-line route salesman in Des Moines, Iowa, or developing systems to support a manufacturing plant in London. "We are developing easy access to reliable, timely and accurate data for business decision-makers," says Porter. **PepsiCo** currently has 1,500 IT professionals and plans to hire more than 300 in 2001.

Pitney Bowes' Tetro says meaningful work is the basis for attracting and developing talented people. Just over a year ago, the company centralized its embedded IT functions in Tech Central, just one step in the critical enablement of technology to support the business. "The opportunities are enormous," she adds. "We are implementing SAP as our core enterprise software and are now planning the next implementation phases. Basically, we need people who can demonstrate that they have used their skills and competencies to produce results, who excel operationally, work on teams well, are committed to understanding diversity and who are adaptable and flexible."

Applied Materials makes the systems that make the products that change the world. "In order to maintain our position as the leader in the semiconductor industry, we need people with strong technical, analytical, teamwork and leadership skills," explains James. "If you want to work hard, work on cutting-edge technology and work with really bright people, this is the company."

# careers

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tomers or to buy another provider."

"AT&T is going to try to maximize the value in its existing network as well as position itself for the future," Nicoll says.

AT&T owns warrants that, if exercised, would result in a 9.5% ownership stake in Velocita.

The new company's management team includes Chairman Bob Annunziata, former CEO of Global Crossing and founder of Telcport; CEO Buddy Pickle, former president of Teligent and UUNET; and President Bob Collet, formerly of Teleglobe Communications and Sprint.

All are industry veterans with a track record of innovation and sustained growth. A Cisco spokeswoman confirmed that this was a big

"AT&T's network is archaic and the cost of operating it is much higher than its competitor's networks . . . ."

Christine Heckart, President, TeleChoice

incentive for Cisco's investment, as was Velocita's unique arrangement with AT&T and "shared vision for an end-toend IP+optical network."

"While we typically will not invest in customers, we will evaluate select opportunities as they come up," the spokeswoman says.

Cisco, continued from page 9

in support ... at least for now. While Cisco may not have the most advanced technology, its customer support sets the company apart from other vendors and is part of the reason why Cisco accounts for "over 99%" of the network gear in his firm, this executive says.

"If they drop back technologically and customer service gets really poor, maybe that's a time to consider looking elsewhere," he says. "But we're so deep into Cisco right now that there would have to be a really compelling reason to do that."

Another reason he is not worried is that Cisco's revenue shortcomings are mostly in the service provider market, which he says is "no skin off my nose."

As to how Cisco got itself into trouble, the executive says the company may have been too active in acquiring new technologies last year. By April 2000, Cisco had acquired nine companies — this year, it has bought none.

"Cisco could have been more conservative," he says. "It will be interesting to see how they act now that they have to behave like a real company."

He also hopes that if Cisco decides to scale back product offerings, it will decide to focus more on improving its What, me worry?

Many Cisco enterprise users say they aren't too worried by the network equipment company's recent financial woes.

For Cisco's fiscal 2001 third quarter (ending May 8):

- Cisco anticipates a 30% drop in revenue from the previous quarter.
- Between 6,000 and 8,600 fulland part-time jobs will be cut.
- The company will take a \$2.5 billion charge for excess inventory.
- The excess inventory charge is split 70%/30% between Cisco's service provider/enterprise businesses.

enterprise product lines.

Another Cisco user, a CTO of a multinational software company, also believes Cisco may have gotten away from its bread-and-butter trade: switches and routers for companies and the Internet.

"Cisco is in no danger of losing its niche [business] of making the routers that connect businesses to the Internet," he says. "Cisco and Cisco IOS have become part of the industry standard." But he questions why the company got so involved in technologies such as IP telephony and videoconferencing.

Velocita will initially purchase \$225 million in Cisco gear over two years, including: the ONS 15800 dense wavelength division multiplexing system for long-haul transport; the ONS 15454 SONET add/drop multiplexers for metropolitan and regional applications; the 12400 series gigabit routers; and the 7600 Optical Services Router.

The carrier will essentially be an all-Cisco shop.

"Cisco brings the ability to integrate the optronics, data and higher-level layers into one system," Collet says. "It's a very powerful motivator for working with Cisco. I've been in the business a long time. It's an absolute nightmare to work with multiple vendors."

## Nationwide build-out

Velocita will use the Cisco gear to light an 18,500-mile nationwide OC-192 fiber-optic network over the AT&T rights-of-way. Velocita will spend \$984 million by year-end to light the first 10,800 miles of the network, according to the 10-Q.

"We're in the process of lighting routes between Jacksonville, [Fla.] and Houston before the end of the second quarter," Collet says. This will be the first portion of the Velocita network that's supporting traffic. It will start offering wavelength services soon after.

Velocita may be unique in its ability to build networks of this type. The company was launched in 1998 as PENet, a network construction company modeled after the utility industry, which has a depth of expertise in pipeline construction and the difficulties of conquering terrain.

In the fall of 1999, PENet won a contract from AT&T to upgrade the carrier's nation-wide fiber-optic network. The contract enabled PENet to build over 5,000 miles along AT&T's rights-of-way, and to construct its own network alongside the AT&T conduits.

A year later, PENet won a second contract with AT&T, extending the network to more than 18,000 miles.

PENet — which changed its name to Velocita in January — was one of three companies that AT&T chose to construct its next-generation network. The other two are Touch America and Cap Rock. Those companies

Fiber rich

Velocita is building an 18,500 mile-long fiber network that will eventually span the U.S.



also have access to AT&T's rights-of-way but Velocita is the only company that's taking full advantage.

Velocita is swapping fiber with Touch America, and also has an agreement with AT&T to jointly market and sell dark fiber on the routes of joint construction.

Other Velocita investors

include PF Holdings and Odyssey Investment Partners. PF and Koch each own 31% of Velocita. Odyssey invested \$125 million in the company and \$225 million from private investors.

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# Edgix to restructure

BY DENI CONNOR

NEW YORK — Edgix, a startup that taps broadband satellite networks to transmit caches of data across the Internet, is in financial trouble, sources within the company said last week.

Sources say the company has laid off most of its employees and is ceasing operations at the direction of its board. Only a skeleton crew is left to sell off the company's intellectual property and assets, according to company sources. Edgix CEO Rangu Salgame would not comment.

"Edgix is restructuring its business and is looking at pursuing a variety of options," says Abhi Chaki, a vice president at Edgix. He refused to divulge those options or restructuring.

Edgix was co-founded in 1999 by Drew Major, former chief architect of Novell and now CTO of Volera, Novell's caching and content delivery spinoff, and several other individuals with backgrounds from UUNET, Bell Atlantic, Level 3, Cisco, Microsoft, Bell Labs, Novell, Motorola, Hewlett-Packard and Lucent.

Edgix isn't alone among suffering companies in the caching and content delivery field. Recently, Infolibria, Inktomi and CacheFlow have laid off employees. Akamai topped \$1 billion in losses last year and has laid off 14% of its employees.

Edgix specializes in Internet edge services with caching, streaming and Usenet news services for service providers. Its caching services are based on Volera's Excelerator software. Some of Edgix' customers are Intellispace.net, Everest Broadband, MM Internet, WT.Net and chello Broadband.

The company's products compete with Cidera, which just raised \$75 million in preferred stock funding. Edgix received first-round funding of \$15 million from Battery Ventures and Venrock Associates, as well as an undisclosed amount from Novell Ventures.

Edgix: www.edgix.com

# IBM: New Unix servers are cool — literally

BY DENI CONNOR

IBM claims network professionals will be able to deploy faster, more reliable Web and application environments with servers and an upgraded Unix operating system that the company plans to launch this weck.

The p620 and p660 eSeries Unix servers use technologies that let them operate with more than one and a half to three times less power and up to 35% faster than previous servers, IBM says. The servers also have self-maintenance features that let them repair themselves when memory or processors are failing. The eSeries servers use IBM's enhanced AIX 5L OS.

IBM's Silicon-on-Insulator (SOI) technology uses chips made with copper, which conducts electricity better than aluminum and reduces the temperature computers run at.

As manufacturers produce faster

## Pharma, continued from page 14

interact with our customers," said Newt Crenshaw, vice president at eLilly, who said he takes the "open sourced innovation in Linux" as his inspiration. For eLilly, that means turning to outsiders in "an open sourced business model" to pay for clinical research help with universities and others over the Internet.

"Even if we're heading West just as the Internet prospectors are coming up empty-handed, we at Lilly are convinced 'there's gold in them thar hills," he said, during a speech at the summit.

The Lilly Venture Fund has invested in PharmQuest, Expert Systems and an Internet-based clinical research company named 1747, among others.

"We're experimenting with e-recruitment with 1747, and we're not impressed with the results yet, but we're convinced it will be important," Cren-

"E-recruitment" means finding suitable candidates for clinical research trials via the Internet.

The pharmaceutical industry has 41,600 locations conducting clinical research trials that require roughly 6,700 volunteer patients per program, according to Forrester Research, which last week released a list of top Web sites for clinical e-recruitment based on their content and search mechanisms (see graphic, page 14).

Michael Barrett, a Forrester analyst, says none of the sites is even beginning to achieve its goals on the scale needed, and he advised competing pharmaceutical companies to band together as the auto industry has in creating an "e-recruitment supersite."

processors, and as faster servers are used in confined data centers, temperature becomes a concern. IBM expects that SOI will eventually replace CMOS in microprocessors.

"We went with these servers because we needed systems that were extremely reliable and robust," says Kevin Smith, CEO of MDoffices.com, a medical services company in New York. "The [servers] use the copper microprocessor so the speed is very good. In addition, SOI lets the machine run at a lower temperature, which works better because you can get a lot more work done on a lot less power."

The servers manage themselves using Chipkill technology, which IBM developed for mainframes. Chipkill eliminates memory failures and is more effective than the error checking and correction technology used in other servers, IBM claims.

"When an area of the memory appears to be going bad, the system turns off that area and uses other areas so data doesn't get lost," Smith says.

"Reliability is important for us because we have a lot of confidential patient information that needs to be maintained," he adds.

MDoffices.com gathers data from doctors equipped with handheld computers and sends them to insurance companies, consultants and pharmacies.

The p620 and p660 also use dynamic

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processor de-allocation, which automatically shifts tasks from one processor to another in the event a processor fails.

The new operating system, AIX 5L, is the first Unix operating system that lets customers build, run and maintain appli-

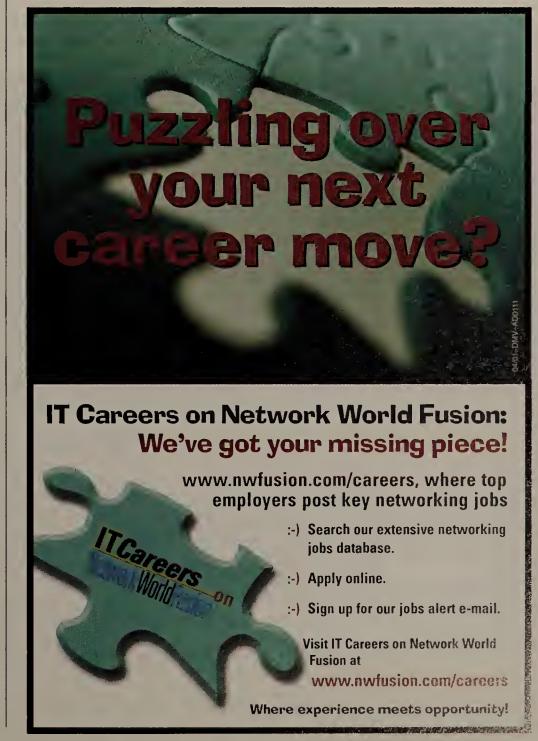
For instance, customers can develop an application using Linux on an Intelbased server and subsequently deploy the same application on a Unix system. AIX 5L runs on PowerPC and Intel 64bit platforms.

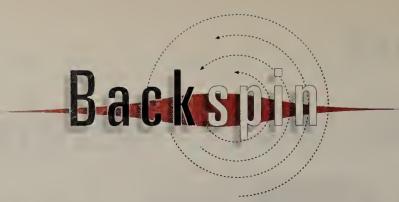
AIX 5L also lets net professionals tie the operating system to external management applications for systems monitoring and collection of usage and resource statistics. AIX 5L can support up to 32 processors and 256G bytes of memory.

The rack-mounted p660 eServer has from one to six processors and is designed for enterprise data centers. The pedestal-based p620 is for departmental or workgroup database or Web server environments.

Both servers feature hot-plug PCI slots, redundant power supplies and cooling fans. A four-way IBM p660 with 4G bytes of memory, 36G bytes of disk space and a tape drive costs \$92,885. Both are available now.

IBM: www.ibm.com





# Crouching company, hidden marketing

<unexpected digression>I don't believe it! As I write this column, the apparently indefatigable Mr. Cosgrove, the spammer and erstwbile tree-hugger I wrote about last week ("Relentless illogical spam," www.nwfusion.com, DocFinder: 3959) and who promised to exclude me from his list, has just spammed the Gearbead column feedback address again!<unexpected digression>

> Anyway, there I was a few weeks ago sitting on an airplane heading for New York. Our in-flight entertainment (and I use the term loosely) included the film "Crouching Tiger, Hidden Dragon," a story of everyday Oriental folk who are all masters of the martial arts (kickboxing, judo, sword fighting, nasty stuff with knives and so on), are incredible athletes, and have the ability to fly in a running-over-the-

> > rooftops-meets-Superman kind of way.

My father-in-law, Quinn, described the film as "Peter Pan in a Chinese restaurant," while I would describe it as unutterable crap.

My heavy-handed criticisms not withstanding, to my utter amazement the picture gained a zillion nominations and

won four Oscars at this year's Academy Awards.

Sure, the cinematography and art direction were very good and the, er, well, that was it. I couldn't find much more to like given that the acting was based on what I assume are Asian theatrical concepts that are in this Westerner's eyes difficult to fathom. Or perhaps the story was just nonsense.

Another story that is equally difficult to fathom centers on Novell and the company's March announcement of a labyrinthine senior staff shuffle that could almost be the plot of some outré high-tech Oriental movie.

Eric Schmidt resigns as CEO of Novell but stays on as chairman and "chief strategist" of Novell and as chairman of Volera (a wholly owned subsidiary of Novell) while Jack Messman, CEO of Cambridge Technology Partners — the company being merged or acquired, depending on your point of view

- becomes CEO of Novell (a role he last had in 1981 when he brought in Ray Noorda to rescue the ailing fledgling). In all of this plotting and scheming, Novell's staff are treated like mushrooms (they are kept in the dark and get ...) as only Schmidt and Novell's CFO, Dennis Raney, were in on the merger, er, the acquisition before it was announced.

Did you get that? Did it all make sense? What? You don't understand how an IT services and e-commerce company could merge with a network infrastructure firm? Well, there you have it, the strange theatrical event that is Novell. Could this be the calm before the storm of a technology sell-off? Or could it be the first blush of a renaissance at the company? Time will tell as, despite a month passing, the story hasn't got past the first chapter.

As you may remember, I have long been a fan of Novell's products. Without doubt, the company has the best directory service available and the most robust file server system you can buy (although Linux is now arguably neck-and-neck on the latter issue). But during the last few years Novell has gilded the product lily with wild abandon.

The company, perhaps in an effort to overcome its marketing inertia, struck out with a deluge of new services and product features that were so badly articulated to whatever markets they were being aimed for (it was hard to tell) that no one but Novell marketing executives imported from an alternative universe could claim to see a reason for corporations to buy into the vision.

Frankly, I hate to see Novell in such a vague, undefined state but that's what you get when there's technological genius without a clear corporate vision.

Perhaps Mr. Messman will be the hero of the piece if we can ever figure out what the story is really about. I wonder if we'll look back in a year's time and want to give him an award? If "Crouching Tiger, Hidden Dragon" can win awards, anything is

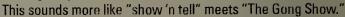
Send explanations of the plot to nwcolumn@gibbs.com.



Job-hunting can be an adventure, as more of you are being reminded every day.

Athene Software in Boulder, Colo., sells Internet customer relationship management products and employs about 85 people. All but the first few hires landed their jobs only after completing the typical office-to-office interview march and a more unusual test of their mettle: a mandatory live "audition" — not a tryout, but a performance — conducted in front of the whole company.

And we aren't talking about a net administrator demonstrating her ability to troubleshoot a router or a developer showing off his coding chops.



A quality-control specialist pounds out African drumbeats to illustrate how he'd tackle a job. A project manager uses his rock-climbing gear as a metaphor for workplace execution. A Webmaster who once toiled at a bread company serves up varieties of bread to show, well, what? That he won't loaf, I presume.

PAUL

MCNAMARA

Those who attend the auditions pass judgment on the candidates and their recommendations on to hiring managers. About 80% of those who audition get hired, says Athene CEO Eric Johnson. Getting bad reviews isn't a deal killer, he says, but it hurts.

Johnson does a great job of selling this stuff. The auditions give hiring managers and a candidate's prospective co-workers an opportunity to learn things about the candidate that don't often emerge in an interview,

"How much does somebody want to work for us? How creative are they? ... Most people respond very positively," Johnson says.

Count me in the minority. Buzz has never been big on corporate rahrah stuff, a reluctance that hasn't always set well with executive cheerleaders.

So there are two ways to look at Athene's auditions:

Let's say I desperately needed the job: Heck, I'd slip on a pink tutu, stand on my head and sing "The Wreck of the Edmund Fitzgerald" if it might increase my chances of getting hired.

On the other hand, if a company were wooing me to work for them (stop laughing; it's conceivable), they'd have to drop the frat-house initiation before I'd even deign to take their phone call.

Athene certainly will soldier on without my services. But, I've got to believe I'm not alone in cringing at the thought of "performing" before my future co-workers.

Which raises this question: Can any tech company afford to limit its applicant pool to only those who are willing to sing for their supper?

Aren't those foreign-language translation programs on the Web truly amazing?... Well, yes and no.

Following a recent Buzz item that took a carrier to task for using a veiled vulgarity in an ad, readers were invited to "use any language you want" when writing with comments.

Robert Fenstermacher thought it would be amusing to take the offer more literally than it was intended, so he fired off an e-mail in Portuquese, which is Greek to me. I was able to guess enough of the words to presume the letter was friendly, so getting a fuller translation seemed worthwhile. A colleague suggested the BabelFish translator at www. altavista.com.

In went: "Eu apreciei realmente ler seu abril 2, coluna 2001 no mundo da rede. Eu gostei especial do "Play Ball" e de parcelas de SOL. Tenha um dia grande."

And out came: "I really appreciated to read its April 2, column 2001 in the world of the network. I liked special it 'Play Ball' and parcels SUN. He

Let's just say you wouldn't want to rely on this thing if you had to translate a ransom note.

English is still your best bet for getting a reply here. The address is buzz@nww.com.



MARK GIBBS







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Reported by Computer Reseller News, May 24, 1999

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